ELECTRONIC INDUSTRIES ALLIANCE

The Technology Industry at an Innovation Crossroads

A Policy Playbook Addressing the Future of the U.S. High-Tech Innovation Economy

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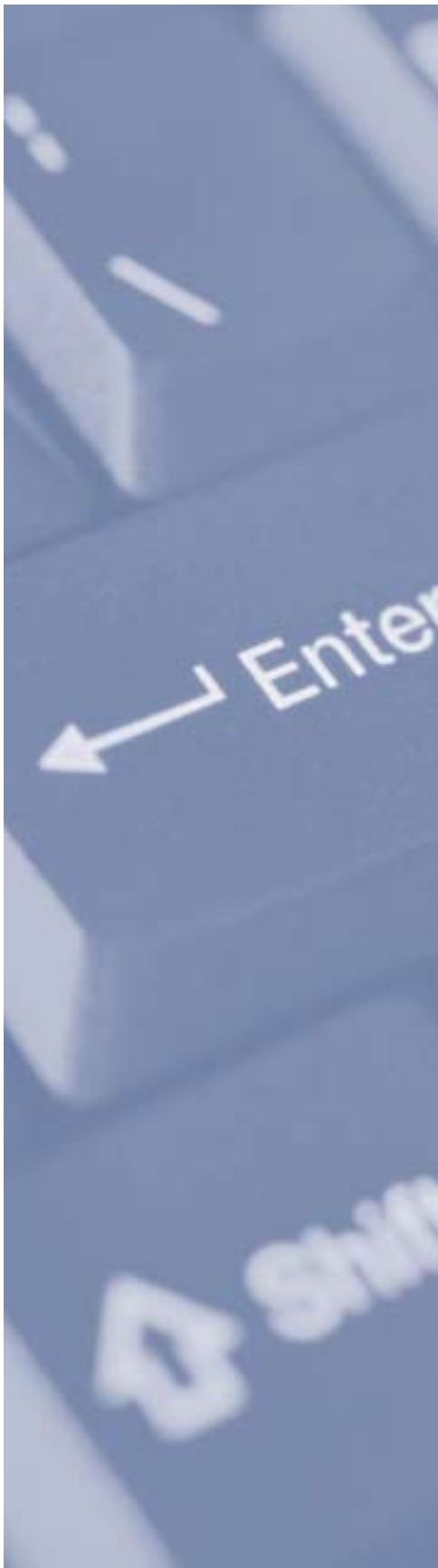


A Note From EIA's President and Chairman

In the summer of 2003, EIA's staff, sector associations and corporate members began to look closely at the significant structural changes taking place in the world economy and in the high-tech industry in particular. Because of our unique alliance structure, EIA and its wide array of member companies are positioned to accurately portray the reality and trends. We are also in a position to develop and advocate policies to address the long-term viability of our innovative sectors.

There is no doubt that open borders – when trading partners play by the rules – are an enormous step forward and that the leaps made in telecom and technological development have changed our world for the better. We started our broad examination with one strong belief: EIA, as an organization, is committed to developing a truly open trading system. With this as our foundation, we have a responsibility to our industry and to the U.S. to address the concerns raised by critics of globalization. The economic recovery that saw slower job growth than expected raised questions for many about the real benefits of increased productivity, the free market system and worldwide sourcing.

To answer these questions, EIA launched a major initiative: "The Technology Industry at an Innovation Crossroads." Together with our project partners from the public policy field, industry and academia, we have taken a broad look at the benefits of open markets and the trends in high-tech manufacturing, design, engineering and research & development. We've taken a measured approach, through forums, surveys and executive interviews. A unique exercise known as Prosperity Games™ – essentially war games for the business world – was a coalescing step for our initiative, as we brought together members of our board, legislators, Administration staff, industry experts and thought leaders for two days in January and emerged with the outline for this playbook.

Our hope is that the recommendations included here will promote public discussion and facilitate meaningful debate, toward the development of a national technology vision and strategy. Because these issues are truly important. We use words like "jobs" and "workforce," but we have to recognize – and EIA does – that these words mean "people" and "lives."

Our biggest concern is not offshore outsourcing, but that demagoguery and political overreaction to this business practice – which, by the way, is not new – will lead to protectionist policies. The lack of an overarching vision, combined with inadequate investment in innovation, contributes to short-term and false choices that could potentially lead to the critics' prophecies of inevitable Chinese or Indian economic dominance. The core value of a knowledge-based company or society should be innovation, which at its heart is creativity plus risk-taking.

"Our whole infrastructure is set up to stay in front of innovation," one industry CEO said last fall. He was speaking of his company, but we should ask whether this is currently true for the U.S. Such a vision and infrastructure should clearly be our goal. In the past, developing nations followed our lead. Now those same nations aspire to lead. We must respond to the challenge and plan. If we don't determine what tomorrow will look like, others will determine it for us.

We invite your comments, and we invite policymakers and regulators to examine these recommendations and work towards strengthening our innovation economy.

We want to thank Storme Street of EIA's staff for her efforts in preparing what we believe is a timely and valuable policy playbook.

Sincerely,

Dave McCurdy
President, Electronic Industries Alliance

Ronald L. Turner
Chairman, Board of Governors, Electronic Industries Alliance
Chairman, President & CEO, Ceridian Corporation

executive summary

Overview

In recent years, the leaps made in telecommunication and technological development have helped many companies revolutionize the way in which they organize, manage and even own their operations. Most U.S. manufacturing and service sectors have been affected, but the changes often come first in the fast-moving, highly competitive electronics industry.

Many of the changes have boosted productivity and yielded cheaper, better, more powerful products, proving beneficial for most Americans. But the resulting reorganization of manufacturing along global lines, plus the creation of new, globally competitive service and knowledge-based industries, also poses unprecedented challenges to the technology industry and to the societies that rely on this sector for products and for high-wage, high-innovation jobs – in short, the knowledge economy.

The current debate over offshore outsourcing has been reduced by many to a binary argument: U.S. jobs vs. worldwide trade. The situation is more complex and multidimensional, and it benefits no one to simplify the matter for rhetoric's sake. There is no such thing as a pure or free market today. Instead the global market is far from optimal, and it doesn't always follow the classical models of economics.

The best hope for the US to maintain its edge against rising global competition is by fostering and expanding our most prized intellectual asset: innovation. Over the past 30 years, innovation has given the U.S. and the rest of the world wave after wave of technological advancement and generated millions of high-skilled jobs. If we want to ensure that successive waves of innovation begin in the U.S., and that U.S. workers are first to benefit from "the next big things," we have to have the necessary innovation infrastructure in place.

There has been a great deal of attention focused in recent months – and rightly so – on U.S. employment. Structural changes in the economy have inhibited job growth even as productivity has risen. Rather than being concerned about quantity, the U.S. must focus on the quality of new jobs created. Specifically, the industry sectors represented by EIA want to help ensure that the new jobs emerging in a global, competitive and technology-based economy are those that encourage and reward high skills levels and bring high wages. Those types of jobs come from the valuable U.S. innovation economy, and we must do everything we can to preserve and strengthen it.

Unfortunately, the U.S.'s ability to adapt, compete and innovate alongside emerging

workforces in countries such as China and India is threatened by a systematically weak education system, a dearth of R&D funding, visa policy that discourages the brightest foreign minds and a business climate heavy with regulatory and tax burdens. If the U.S. wants to remain the world's innovation leader, we must adopt positive policy solutions, rather than isolationist or protectionist measures, to address these problems.

Policy Recommendations

In this report, EIA has outlined a set of policy solutions that we believe will allow the U.S. to continue to enjoy world leadership and realize the benefits of free trade, including the creation of high-quality, high-wage jobs for U.S. workers. These solutions address six key areas:

- Working with U.S. trading partners to ensure open markets and a free, fair and secure trading environment;
- Advocating visa and immigration policy that acknowledges security needs without building walls;
- Improving the U.S. business landscape, including the tax and regulatory regimes;
- Encouraging a system of continual skills training and worker education;
- Building the K-12 school system our children deserve, and
- Making basic research a funding priority. ■

The International Business and Trade Environment

Engage government officials of the highest rank in cases where improper trade practices rise to a level that warrants such attention, including persistent non-tariff policies that have implications for economic or physical security.

Institute Presidential benchmarks for progress in resolving trade disputes, where appropriate.

Undertake more aggressive action in using the WTO legal system, where appropriate.

- **Use Section 301** wherever it may be consistent with U.S., WTO and other international obligations.
- **Give special attention to compliance problems with China**.

Support more aggressive enforcement of IP protection by U.S. trading partners, with high-level U.S. government officials – starting with the President and the U.S. Trade Representative – giving higher priority to enforcement. In addition, **the International Trade Commission should use Section 337**, when appropriate.

Adopt U.S. policies that encourage and support the development of voluntary, open standards that promote innovation and the competitiveness of U.S. businesses. In addition, government should **encourage U.S. trading partners to develop similarly voluntary and open standards** and to promote due process and IP rights protection.

Promote international standards on product design to certify compliance with design restrictions limiting the use of certain chemicals.

Promote voluntary energy programs such as Energy Star, increasingly recognized as the international symbol for energy efficiency.

Encourage China to tie the yuan to a broader basket of currencies, which could include the euro and the yen as well as the dollar. ■

Visa and Immigration Policy

Improve the Visas Mantis process consistent with recommendations of the 2004 U.S. Government Accounting Office report, including:

- **Establish milestones** to reduce the current number of pending Visas Mantis cases.
- **Develop performance goals and measurements** for processing Visas Mantis checks.
- **Reinstate a time limit** within which "interested parties" such as the Defense Department and the FBI must respond to visa applications subject to the SAO.
- **Provide additional information,** through training or other means, at consular posts to clarify guidance on the overall operation of the Visas Mantis program.
- **Work to achieve interoperable systems** and expedite transmittal of data between agencies.

Provide adequate funding and resources for streamlining the visa process and tracking statistics so that agencies can safely discriminate between those visitors who have demonstrated their trust-worthiness and those who have not.

- **Provide the State Department with increased funding and the resources** necessary to schedule and conduct personal interviews in a timely manner. In addition, we encourage the State Department to ensure it has experienced and qualified personnel serving as visa officers.
- **Task the Department of Homeland Security with maintaining statistics on L-1 and H-1B visas**, including applications, approvals and extensions. Additional funding would also allow DHS to better train immigration service center personnel to reduce mistakes and streamline the processing of visa applications and extensions.
- **Task the State Department with tracking statistics** related to visas for scientists and engineers, including applications, approvals and expiration dates.
- **Task the State Department and DHS with fast-tracking the visa approval process** for known business, research and education visitors, as well as U.S.-based foreign national employees. People who have been provided with visitor and employment visas in the past to participate in business or scholarly events and have not violated U.S. immigration laws should be issued expedited visas if their names do not appear on any of the nation's security watch lists.

Strengthen enforcement of existing visa laws and regulations. With increased funding for oversight, the Department of Homeland Security, which oversees immigration services, would be better equipped to ensure that employees using these visas have the qualifications mandated and that abuse of the system is more difficult.

- **Clarify the definition of "specialized knowledge"** for L-1 visa programs.

- **Tighten the restrictions** on the L-1 visa category, denying L-1B status to "specialized knowledge" personnel if the foreign nationals would be (1) supervised and controlled by an employer who is not affiliated with the employer for whom the petition was granted and/or (2) placed with an unaffiliated employer to provide labor that does not involve the specialized knowledge specific to the petitioning employer. ■

Workforce Assistance and Training

Modernize, revamp and rename TAA as the Effective Workforce Assistance program to reflect the structural changes in the economy that mandate a workforce with higher skill levels. Effective Workforce Assistance would work through the Department of Labor's Office of the 21st Century Workforce to:

- serve all displaced workers, regardless of sector or displacement factor;
- coordinate more closely with industry at the local and federal level to develop worker training programs that reflect U.S. skills needs;
- offer workers over 35 the option of wage insurance; and
- provide for the portability of healthcare benefits and pension funds.

Subsidize displaced high-tech workers who go into K-12 math and science education, either as teachers or as classroom resources. If this program were operated through the Effective Workforce Assistance program, it could include wage insurance and fast-track education certification.

Establish a national program of community college and industry partnerships to train students and mid-career workers for relevant technology careers. Industry involvement in building the curriculum, providing internship and co-op opportunities, and post-graduate hiring would better ensure that graduates enter or reenter the workforce with truly marketable skills.

Implement a "human capital" investment tax credit.[1] A credit equal to 50% of a company's annual expenditure on training would mitigate any reluctance companies have to invest in training. ■

The U.S. Business Environment

Use Congressional power to review and reject new regulations more aggressively. The Congressional Review Act of 1996 requires agencies to send all final regulations to Congress for review. By a simple majority in both houses, rules deemed inappropriate can be disapproved. Increased use of this oversight power would be a positive way in which Congress could quash unnecessarily costly or burdensome rules.

Require review of proposed state regulation and legislation to determine impacts on small businesses and whether there are alternate means to achieve the same results.

Implement measures that simplify U.S. tax policy and minimize cases of

[1] *Catherine L. Mann, "Globalization of IT Services and White Collar Jobs: The Next Wave of Productivity Growth," International Economics Policy Briefs, No. PB03-11 (Washington: Institute for International Economics, December 2003).*

double taxation. Special preferences and penalties throughout the code increase the cost of compliance for corporations. In addition, rules on worldwide earnings and foreign tax credits currently serve to overburden companies.

Pass the Homeland Investment Act/Invest in the USA Act. A study by J.P. Morgan estimates that a one-year, 85% reduction in corporate tax on foreign earnings could lead to a $300 billion U.S. inflow.[2]

Implement an employment tax credit. As a way of encouraging domestic employment, the federal government should provide a tax credit for a company's net full-time new hires of permanent workers in the U.S.

Base federal funding of state Innovation Extension Partnership (IEP) programs[3] on measurements of states' business environments. Tiered levels of funding could be made available as states reached specific goals designed to make their regulatory and tax policies more business friendly. Sunsetting this program after 10 years would provide states with an incentive to make swift improvements.

Prevent inconsistent state electronics recycling requirements through a comprehensive national program. A comprehensive, industry-supported national recycling program is needed to prevent a piecemeal state-by-state approach. Therefore, the Administration and Congress must demonstrate leadership by making federal legislation a priority.

Eliminate and prevent state environmental design requirements. Legislation has been proposed or enacted in some states that will restrict the electronics industry's use of chemicals that provide unique functionality and often safety benefits. To avoid inconsistent design requirements and barriers to interstate commerce, the federal government should promote voluntary national programs on environmental design, such as the Energy Star Program.

Support a "physical nexus" clarification for states to impose a business activity tax (BAT) on non-resident businesses. Some states have become increasingly aggressive in pursuing novel tax collection methods, including charging BAT to companies with "economic nexus." Legislation to clarify a requirement of physical nexus would ensure certainty for businesses and minimize unnecessary litigation.[4]

Task the Administration with developing a national broadband policy and implementation strategy. The overriding objective of

[2] *U.S. Congress, Senate,* Invest in the U.S.A. Act of 2003*, 108th Congress, S. 596 (March 11, 2003) and U.S. Congress, House,* Homeland Investment Act of 2003*, 108th Congress, H.R. 767 (Feb. 13, 2003). S. 596 was introduced by Senators John Ensign (R-NV) and Barbara Boxer (D-CA), and H.R. 767 was introduced by Rep. Philip English (R-PA).*

[3] *The proposed Innovation Extension Partnership is as an expanded version of the Manufacturing Extension Partnership, as recommended by EIA in Chapter 6.*

[4] *U.S. Congress, House,* Business Activity Tax Simplification Act of 2003*, 108th Congress, H.R. 3220 IH (Oct. 1, 2003). This legislation was introduced by Reps. Bob Goodlatte (R-VA) and Rick Boucher (D-VA).*

this public-private partnership should be to ensure that all Americans have access to high-speed Internet access technologies in the immediate future.

- Affordable, advanced and secure communications services should be available to all Americans.
- Competitive market forces, not regulation, should be the principal means of achieving this goal.
- Government should intervene only where such intervention (1) is necessary to effectively address a specific, critical problem and (2) is targeted and otherwise designed to minimize disruption to competitive market forces.
- Government should make available the necessary radio spectrum for the deployment of advanced communications services.

Implement tax credits or expensing to encourage broadband providers to extend and upgrade their networks. A 10% tax credit for current-generation broadband investment in rural and underserved areas and a 20% credit for next-generation investment, or an equivalent tax expensing option, would make a positive contribution to the economy, improve workplace efficiency and bring new services to communities.[5] ■

K-12 Math and Science Education

Require industry involvement in the U.S. Department of Education's Math & Science Partnership (MSP) program. The current MSP grants require partnerships between high-need public schools and the science, technology, engineering and math (STEM) departments of colleges and universities. Business involvement is optional at this point but should be made mandatory. Incentives for such involvement could include:

- **Federal seed money** to businesses to fund the first two years of STEM partnerships with K-12 schools. An awards system to identify the most successful programs in each state would allow these ideas to trickle up to the federal level and be replicated in other locations.
- **Partial rebates** that allow companies with longer-term STEM partnerships to submit receipts for the money spent on such programs.
- **Tax credits** for business expenditures on direct contributions that aid STEM education in K-12 schools.

Encourage new STEM-oriented teachers and ensure experienced teachers' skills are strengthened. There are a number of incentives that can be offered to K-12 educators, including:

- **Support summer co-op programs in high-tech fields for teachers.**
- **Provide a 10% tax credit** for K-12 STEM teachers against qualifying undergraduate tuition expenses.
- **Establish low-interest loans or loan forgiveness** from the Department of Education for STEM college and university graduates who take jobs in K-12 STEM education.

Require school districts to consult a board of industry representatives on STEM and business curriculum, and skills requirements.

Encourage state provisions that allow taxpayers to direct money on their income tax returns towards specified education-related programs, facilities, institutions or districts.

Encourage policies that promote

[5] U.S. Congress, Senate, 108th Congress, S. 160 (Jan. 14, 2003); U.S. Congress, Senate, 108th Congress, S. 905 (April 11, 2003); U.S. Congress, House, 108th Congress, H.R. 768 (Feb. 13, 2003); and U.S. Congress, House, 108th Congress, H.R. 768 (Feb. 13, 2003). S. 160 was introduced by Senators Conrad Burns (R-MT) and Max Baucus (D-MT), and S. 905 was introduced by Senator John Rockefeller IV (D-WV). H.R. 768 and H.R. 769 were introduced by Reps. Philip English (R-PA) and Robert Matsui (D-CA).

school choice for K-12 students and their parents.

Require significant changes to the No Child Left Behind Act in order for its 2008 reauthorization. There is concern that the federal testing requirements under the Act have initiated a "race to the bottom" at many schools, and modifications must be made to ensure that this does not continue. First among the changes needed is **reform of the grant system.** ■

Research and Development

Support longer-term funding of a more balanced portfolio of basic science and engineering research, to include adequate funding of physical sciences, engineering, mathematics, computer sciences, non-medical life sciences, environmental sciences, and social sciences, with a more informed process for assessing priorities and providing balance across fields to better facilitate innovation.

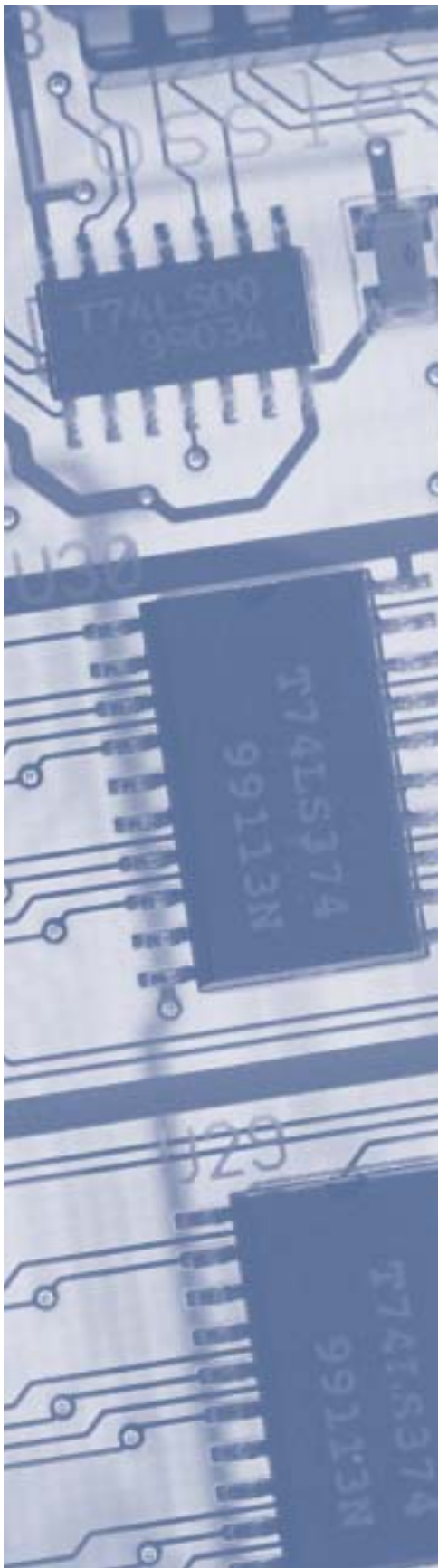
- **Make basic research components a top priority** in the FY2005 budget.
- **Provide funding for Department of Defense science and technology accounts at 3% of the total FY2005 defense budget.**
- **Increase the FY2005 funding level for the National Science Foundation by 15%** over the FY2004 enacted budget, in line with Congress and the Administration's commitment to this agency.
- **Increase appropriations for the Department of Energy's Office of Science** consistent with proposed funding levels in the Energy Bill (H.R. 6).
- **Support the National Vision for U.S. Space Exploration and the FY2005 NASA budget request.**

Restore funding for key technology partnership programs, provide permanent economic incentives, and undertake program reforms to accelerate commercialization of R&D results.

Restore funding in the FY2005 National Institute of Standards & Technology budget, both for laboratory programs and the extramural programs, the Manufacturing Extension Partnership and the Advanced Technology Program.

Strengthen and permanently extend the R&D tax credit.[6] The

[6] *U.S. Congress, Senate,* Investment in America Act of 2003*, 108th Congress, S. 664 (March 19, 2003) and U.S. Congress, House,* Investment in America Act of 2003*, 108th Congress, H.R. 463 (Jan. 29, 2003). S. 664 was introduced by Senators Orrin Hatch (R-UT) and Max Baucus (D-MT). H.R. 463 was introduced by Reps. Nancy Johnson (R-CT) and Robert Matsui (D-CA).*



lack of a permanent credit causes uncertainty and could result in decisions by some to locate future projects offshore, where R&D policies are more generous and stable.

Raise funding levels for Phase I and implement, within all Small Business Innovation Research (SBIR) program funding agencies, fast-track procedures to eliminate time lags between Phase I and Phase II award cycles.

Strengthen and give greater flexibility to the ability of the private sector to collaborate with and commercialize government-funded research, especially at universities, national laboratories and other federally funded research and development centers, to enhance creation and/or growth of U.S.-based regional clusters.

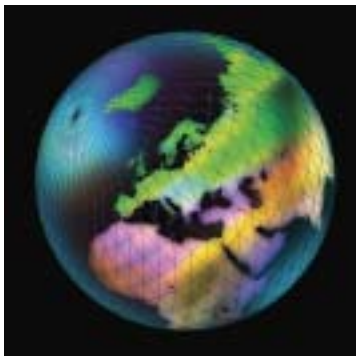
Provide greater formalization and consistency in technology transfer oversight, accountability and practices enabled through key technology transfer legislation such as the Bayh-Dole and Stevenson-Wydler Acts of 1980.[7]

Extend and expand upon the success of the Manufacturing Extension Partnership model to create an Innovation Extension Partnership (IEP) to promote and enhance states' capacity to cultivate regional clusters for technology-based economic development. Similar to MEP, the objective of the new IEP would be to create a nationwide network of not-for-profit centers funded by federal, state, local and private resources. Centers would be tailored to enhance the state or regional ability to leverage local expertise, resources, and networks to create an environment for investments in R&D and commercial innovation.[8] ■

[7] Bayh-Dole, Stevenson-Wydler and their successive amendments have helped to provide a favorable, uniform patent and licensing environment for transfer of government-funded inventions to the private sector for commercialization. A summary of these and related technology transfer legislation can be accessed at http://intramural.nimh.nih.gov/techtran/legislation.htm.

[8] Recommendation based on policy advocated by Lori A. Perine, Interpretech, LLC, in private interviews based on forthcoming white paper, March 2004.

introduction



In recent years, the leaps made in telecommunication and technological development have helped many companies revolutionize the way in which they organize, manage and even own their operations. Most U.S. manufacturing and service sectors have been affected, but the changes often come first in the fast-moving, highly competitive electronics industry.

Many of the changes have proved to be beneficial for most Americans. New forms of global production have boosted productivity and yielded cheaper, better, more powerful products. But the radical reorganization of manufacturing along global lines also poses unprecedented challenges to the technology industry and to the societies that rely on this sector both for products and for high-wage, high-innovation jobs – in short, the knowledge economy.

During the last half of the 20th century, the U.S. emerged as a globally recognized leader in technological development. More than half of the nation's economic productivity during that period was attributable to the intangible but critical phenomenon of innovation. This economic growth not only contributed to the competitiveness of the traditional technology sector, including electronics, manufacturing and processing industries, but also spawned the creation of new, globally competitive service and knowledge-based industries.

The U.S.'s success in facilitating and capturing the economic benefits of innovation is increasingly the subject of study and emulation by other countries. Japan, the European Union, and more recently China have made considerable progress in successfully adapting features of the U.S. innovation model in an attempt to gain parity with or even challenge the U.S. competitive edge.

The current debate over offshore outsourcing has been reduced by many to a binary argument: U.S. jobs vs. worldwide trade. The situation is more complex and multidimensional, and it benefits no one to simplify the matter for rhetoric's sake. There is no such thing as a pure or free market today; instead we have a global market that is far from optimal. That is reality, and it doesn't always initially resemble the models in our economics textbooks. For centuries, free market economies have benefited from free trade and vice versa. But to realize the benefits of both we need strong political leadership.

In short, the U.S. is being confronted by the power of other economies. Our best hope to survive this competition is by fostering and expanding our most prized intellectual asset: innovation. Unfortunately, our ability to adapt, compete and innovate alongside emerging workforces such as China and India is threatened here in the U.S. by a systematically weak education system, a dearth of R&D funding, visa policy that discourages the brightest foreign minds and a business climate heavy with regulatory and tax burdens.

In the past 30 years, innovation has given the U.S. and the rest of the world wave after wave of technological advancement. Innovation has also generated millions of high-skilled jobs. Down the road, innovation can help us create "the next big thing" and with it a new wave of technological advances and high-skilled jobs. But if we want to ensure that successive technological waves start in the U.S. and benefit U.S. workers first, we have to have the necessary innovation infrastructure in place.

There has been a great deal of attention focused in recent months on U.S. employment – and unemployment – numbers, which is only reasonable at a time when structural changes in the economy have prohibited job growth from keeping pace with other rising indicators. Our primary concern is not the quantity of new jobs created. What the U.S. must focus on is the quality of new jobs created. Specifically, our industry wants to help ensure that the new jobs emerging in a global, competitive and technology-based economy are those that encourage and reward high skills levels and bring high wages.
Those types of jobs come from our valuable innovation economy, and we must do everything we can to preserve and strengthen it. If we fail to keep the innovation system thriving, the U.S. will continue to see a widening gap between low- and high-skill jobs, and commensurate pay scales.

Worldwide trade is a foundation for the nation and the economy, and what propels that trade is innovation. If we want to be the leader among innovation nations, we need to adopt positive policy solutions, rather than isolationist or protectionist measures. Those solutions include working with our trading partners to ensure open markets and a free, fair and secure trading environment; advocating visa policy that acknowledges security needs without building walls; improving our own business landscape, including the U.S. tax and regulatory regimes; encouraging a system of continual skills training and worker education; making basic research a funding priority; and building the K-12 school system our children deserve. ■

chapter 1

The expansion of the free market and the open international trading system has been a key ingredient in U.S. economic growth, enhanced competitiveness and an increased standard of living. Advances in transportation and communications speed the opening of markets around the world, while bringing hope, opportunity and stability to previously isolated communities. As new technologies shrink the globe, economies that are unwilling or unable to compete in the international marketplace are left behind.

Trade stimulates productivity growth because it enhances competition and makes possible enormous economies of scale in manufacturing, services and marketing. It provides consumers with a broader array of low-priced goods and services. It attracts foreign direct investment to help drive regional economic growth.

These benefits accrue not only to the U.S., but also to our trading partners. This mutuality has the dual advantage of promoting U.S. economic growth and competitiveness and facilitating global stability. The opening of markets and the free flow of goods, services, people and – most importantly – ideas have enabled developing and emerging economies to raise the standard of living for their populations and to improve their own industries, learning centers and infrastructures. This in turn has brought greater stability, both economic and political, and enhanced U.S. bilateral relations in regions of the world where the U.S. has vital foreign policy interests, especially China, South Korea and the states emerging from the former Soviet Union.

With these benefits come responsibilities. Companies doing business abroad have expectations that countries will provide a transparent business environment free from barriers to markets, capital and labor. This includes protection from misuse, misappropriation or abuse of companies' physical and intellectual assets. The federal government has a vital role in helping to ensure that our international trading partners make and honor contractual commitments to privacy, information security, intellectual property rights and the rules of free and fair trade. The lukewarm reception given by officials in India to comments along these lines by U.S. Trade Representative Robert Zoellick[1] demonstrates that there is still progress to be made.

The U.S., too, must keep these responsibilities in mind. It is difficult to take the high

[1] *Sultan Shahin, "India readies to state its case,"* Asia Times*, March 2, 2004.*

road with other countries reluctant to open their markets if we are guilty of protectionist measures ourselves. Policies designed to directly block offshore outsourcing or to penalize companies for doing business in their international sales markets will only encourage our trading partners to retaliate with similar initiatives. This sort of activity is counterproductive and will harm consumers, employees and entire economies in the end.

Executive Branch Leadership and Free Trade Agreements

Against this backdrop, free trade agreements (FTAs) are a critical part of the international trading system. They allow companies to compete on level playing fields, they protect consumers from hidden import taxes on merchandise, and they advance the security of trade. In this way, they lock in the benefits of free trade for all.

EIA strongly supports the Office of the U.S. Trade Representative (USTR) and the U.S. government generally in the expansion of free trade, through multilateral regional and bilateral agreements. We believe broad FTAs that reduce tariffs and non-tariff barriers to low levels – and to zero, where possible – are in the interests of the U.S., its consumers and its companies. Individual FTAs are also a powerful incentive for countries to participate in the WTO efforts to reduce tariffs globally.

Compliance with trade agreements once they are negotiated is essential both to ensure that the full benefits of these agreements are realized and to solidify public support for FTAs. Where U.S. trading partners shirk their responsibility to enforce trade rules on domestic interests, flout those rules themselves or enact non-tariff barriers to trade, the U.S. government must effectively employ appropriate tools to en-

A SPECIAL NOTE ON THE IMPACTS OF TECHNOLOGICAL CHANGE

More than ever, technological change has revolutionized the international business environment, so that companies now make greater use of geographically distributed labor, manufacturing and development centers. This has induced particularly challenging adjustments for the domestic job market. Yet even when the costs of short-term job dislocation are taken into account, economists find that the benefits of trade to the nation continue to outweigh the costs by 2 to 1.[1]

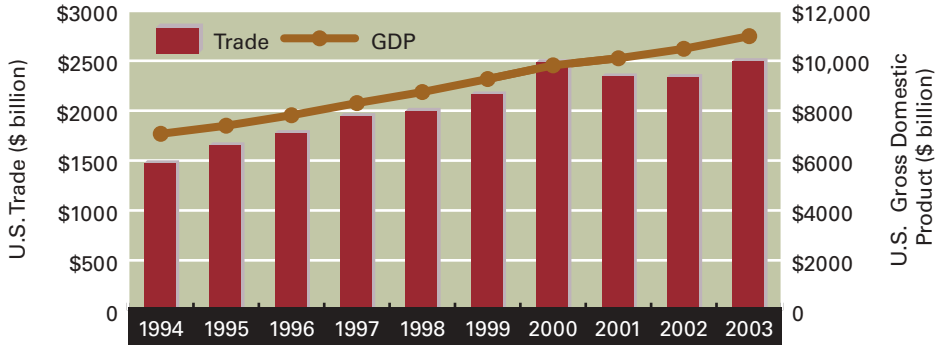
EIA believes it is essential that federal policies focus on easing workforce transitions, rather than creating trade barriers, ostensibly for the protection of U.S. workers. Isolationist approaches serve to undermine U.S. competitiveness and shortchange the nation with respect to the broader benefits of trade. Chapter 3, *Workforce Assistance and Training*, explores this issue in greater detail.

Similarly, technology now enables a greater exchange of goods, services and ideas that are confidential, proprietary, business- or personally sensitive, or even of strategic interest for national security. Experience has shown that broad controls to prevent transfers of products, technology or knowledge are not particularly effective. Restrictions rapidly become out of sync with the evolution of technology and markets.

EIA recognizes that both business and U.S. national interests are best served when trade is free, fair and secure. Ensuring protections of key assets such as consumer privacy, intellectual property, information and critical physical infrastructure is an increasingly vital component of the trading system. The lack of such protections acts as a non-tariff barrier to trade and should be explicitly addressed as such in the establishment and enforcement of U.S. trade pacts.

[1] *Michael W. Klein, Scott Schuh and Robert K. Triest, "Job Creation, Job Destruction and International Competition," W.E. Upjohn Institute for Employment Research, December 2003.*

Hand in Hand: U.S. GDP Growth and Trade Growth



Source: Department of Commerce, Bureau of Economic Analysis

courage adherence to the terms of agreements.

Open dialogue with industry is a key element as the U.S. government negotiates new agreements and works to ensure compliance with those already in place. In some cases, government officials may be better positioned than individual companies to raise sensitive issues with foreign government counterparts and insist on resolution that will balance the interests of all parties. Furthermore, trade pacts can be used as tools of encouragement for countries to move towards more favorable business and economic conditions, and industry can often provide the best information about this landscape.

RECOMMENDATIONS

Engage government officials of the highest rank in cases where improper trade practices rise to a level that warrants such attention, including persistent non-tariff policies that have implications for economic or physical security (see the accompanying text box). Although the direct involvement of the President is certainly not called for in every such dispute, the willingness of the President to directly call attention to problems and to insist upon fair and prompt solutions can be extremely helpful in ensuring compliance when trading partners are in violation of, or not in full compliance with, trade agreements.

Institute Presidential benchmarks for progress in resolving trade disputes, where appropriate. In addressing the problem of abuse of the rules of trade, it may be worthwhile to develop quantifiable goals to determine to what degree violations of the law are being addressed. ■

> ***"Greater expansion of trade would provide support for sustained economic growth and job creation. If this potential is to be realized the many trade distortions that exist must be addressed, and the best way to do that is to bring about a successful conclusion to the Doha Development Agenda."***
>
> Supachai Panitchpakdi,
> Director General, World Trade Organization

ADVANTAGES TO THE USE OF SECTION 301 IN TRADE DISPUTE RESOLUTION

Section 301 still serves a number of vital functions.

First, it continues to be fully effective to address improper trade barriers imposed by non-WTO nations.

Second, even with regard to WTO members, Section 301 can be invoked in cases involving issues outside the purview of the WTO, such as a violation of a bilateral FTA or a topic the WTO does not cover (e.g., government toleration of private anti-competitive practices).

Third, and by far the most frequent current use, Section 301 can be invoked as a U.S. procedural vehicle for launching and prosecuting WTO disputes. Although USTR can initiate WTO disputes without invoking Section 301, it can send a stronger message by doing so. Section 301 action indicates that USTR takes an issue seriously and intends to advance the case under tight timeframes and take retaliatory action if the challenged measure is found improper by the WTO and not repealed or reformed. In this way, Section 301 leaves to the WTO the substantive determinations of whether a WTO violation exists and of whether trade sanctions are appropriate, but makes clear that the U.S. takes a matter quite seriously, will seek the fastest possible adjudication of the matter and will retaliate if permitted.

Finally, Section 301 provides a unique opportunity for U.S. businesses and organizations to petition the government and compel it to examine trade barriers. These petitions generally receive attention in the press and on Capitol Hill, and USTR typically holds a hearing, which allows various interests to comment.

Legal Action

Membership in the World Trade Organization (WTO) requires nations to extend non-discriminatory trade status to one another. The WTO also evaluates and adjudicates members' complaints of alleged discriminatory and otherwise unfair trade practices. It is important that the U.S. work towards a timely resolution in any dispute with our trading partners before moving to legal action, but it is equally important that the government be willing to begin legal action when negotiations have been exhausted.

The case brought this March by the U.S. against China was a landmark, as it was the first WTO case filed against the newly acceded country[2]. After a year of pressure by U.S. companies against a tax rebate for domestically manufactured semiconductors in China, the case for legal action was legitimate and strong.

U.S. trade laws are also a valuable component in the resolution of trade dispute resolution. The enforcement mechanisms provided for by Section 301 of the 1974 Trade Act[3] provide U.S. interests an avenue for complaint and a forum in which the government can assess the validity of complaints. In the past, Section 301 was used as the big stick of U.S. trade agreement enforcement, invoked in connection with almost all possible unfair international trade barriers – i.e., a violation of U.S. trade agreements or otherwise unjustifiable, unreasonable, discriminatory or burdensome trade practices by a foreign government, such as a failure to provide adequate intellectual property protection –

[2] On March 18, 2004, U.S. Trade Representative Robert Zoellick filed the first case against China since it joined the WTO, charging that its tax policies unfairly limit U.S. semiconductor imports.

[3] For text of Section 301 of the 1974 Trade Act, see http://www.usinfo.org/law/majorlaws/301.htm, prepared by Jean Heilman Grier, August 1996.

and providing the President full and final authority to determine whether a foreign practice was actionable and, if so, what action to take.

Since the end of the Uruguay Round of multilateral trade negotiations and the establishment of the WTO in 1994, the U.S. has curbed its unilateral action under Section 301, in effect refraining from deciding for itself whether another WTO member has violated WTO rules and from imposing any form of trade sanctions without WTO authorization. (See textbox on page 16 for more information.)

RECOMMENDATIONS

Undertake more aggressive action in using the WTO legal system, where appropriate. In past instances where the U.S. government has pursued complaints before the WTO, that action has constituted a significant step toward the eventual resolution of the conflict. EIA believes that USTR must not hesitate in filing complaints when trade partners remain obstinate in the maintenance of trade barriers.

- **Use Section 301 wherever it may be consistent with U.S., WTO and other international obligations**. USTR's use of Section 301 can serve to highlight unfair foreign trade practices and put pressure on foreign governments to eliminate these practices.
- **Give special attention to compliance problems with China.** China is a new WTO member and many have been willing to allow the country time to fulfill its WTO responsibilities. Now, however, China has enjoyed a reasonable grace period. For the electronics industry, Chinese policies pose significant challenges on several fronts, including taxation of semiconductors, standard setting and intellectual property protection. In many cases the scale of the problems in China is large, and China's industrial and trade policies on electronics have global implications. In light of this, EIA urges the U.S. government to pay particular attention to significant Chinese practices in making decisions on Section 301 and WTO litigation. We also urge the government to press for a thorough review of China's trade policies in the WTO oversight process set forth in the country's WTO accession agreement. ■

Information and Cyber Security

In a marketplace that is increasingly focused on services rather than goods, information is a critical asset. By its very nature, however, information is also more difficult to defend and secure than physical assets. The Internet and many other information sources are inherently international, interactive and interdependent. Through its Internet Security Alliance[4], EIA advocates a model for information and Internet security that uses market incentives and relies on private industry taking responsibility.

While the U.S. government certainly has a strong interest in the security of software and other information products developed internationally and sold in the U.S., a traditional regulatory structure is not necessarily

[4] The Internet Security Alliance is a joint venture between EIA and the Carnegie Mellon CERT Coordination Center. More information is available from http://www.isalliance.org.

appropriate or realistic for the information sector. Because it is clearly in companies' own best interests to ensure that the products they buy and sell are secure and free from malevolent code or hidden "trapdoors," EIA believes that the market can and must be used to provide incentives.

Many in the industry have already begun to rise to this challenge, but all companies must realize that if their business partners are insecure, their own business is insecure.

Positive incentives are more likely to generate long-term and more effective results and will ultimately increase consumer and business confidence in the use of advanced technology. These incentives could include private-sector excellence designations (similar to the Baldrige Award); cyber-insurance discounts for companies engaged in best practices; and vendor certification programs.

Intellectual Property

Intellectual property (IP) protections are used to grant rights for ownership and use of ideas, inventions, trade secrets and other business intellectual assets, including a business name or brand. Companies strategically use IP assets to enhance competitiveness and profitability, whether through exclusive use of IP-related products and services or through licensing, sale or acquisition of the assets. Companies acquire IP protections to ensure that they will recoup the time and resources spent in developing new products, with the expectation that they will enjoy exclusive right to profit from those inventions for a certain period of time.

IP rights usually are protected only in the country or region where protection has been applied for and obtained. Assurance that IP rights will be respected and protected is a major factor in encouraging business participation in a given international market. Differences between national IP laws and their enforcement can be exploited by governments in order to create protectionist barriers to free and fair trade. Even where strict laws exist, some countries have lax or nonexistent enforcement, leaving businesses with little or no recourse when their IP is stolen.

Many high-tech companies have expressed significant concerns about IP protection in the Chinese market. Despite improvements over the past decade, piracy of copyrighted products remains a major problem. It is estimated that U.S. companies lost more than $1.8 billion to IP theft in China in 2002. According to estimates, piracy levels remain at more than 90% in China for all copyright industries, including 95% for movies.[5] Perhaps most worrisome are foreign government policies of forced licensing and of support for domestic firms that pirate products. An additional concern is that leakage or direct theft of sensitive, advanced technical IP could be used by Chinese military to circumvent defense- and espionage-related export controls.

U.S. companies lost more than $1.8 billion to IP theft in China in 2002.

U.S. companies also register complaints about South Korea, which was elevated to USTR's Priority Watch List in January, due to piracy of online music and U.S. motion pictures. It is reported that U.S. copyright holders lost $572 million lost to piracy in South Korea in 2002.[6] Pakistan, Ukraine and India are among other countries cited as nations with insufficient IP protections.

[5] *International Intellectual Property Alliance (IIPA), "Executive Summary,"* 2003 Special 301 Report: People's Republic of China *(Washington: IIPA, Feb. 14, 2003).*

The problem of piracy and other IP theft continues, despite the fact that the U.S. continues to negotiate higher standards of IP protection and enforcement through the free trade agreement process – most recently with Singapore, Chile, Central American countries and Australia. U.S. trading partners must take IP protection seriously in order for all nations to benefit from free and fair trade. The U.S. must encourage its trading partners to enforce these protections. This is a national priority, because it helps preserve the advantage in the creation and commercialization enjoyed by companies with a significant investment in the U.S. Further, it helps preserve the jobs of Americans engaged in and supported by those industries. Finally, it can provide greater security in the trade system.

> ***"We need to understand that trade is not the problem, it's part of the solution."***
>
> Senator Joseph Lieberman, D-CT

In addressing issues of commercial piracy and the distribution of counterfeit products, however, we must be careful to avoid any perception that we are internationalizing our own debates, under U.S. copyright law, about the proper extent of private, noncommercial fair use by consumers.

RECOMMENDATION

Support more aggressive enforcement of IP protection by U.S. trading partners. Patent and copyright enforcement must be a high priority for the U.S., and where government officials – starting with the President and the U.S. Trade Representative – push for enforcement, trading partners are more likely to cooperate. In addition, **the International Trade Commission should use Section 337**, when appropriate. Section 337 of the Trade Act gives U.S. firms the right to file complaints with the ITC, which can lead to the exclusion from the U.S. of imported goods based on stolen IP. ■

Product Certification

One of the most significant barriers facing the development of a truly global technology marketplace is the difficulty that companies encounter in having products approved or certified for use in various countries. These restrictions – which are often duplicative and in many cases unnecessary – increase the cost to users and delay the availability of products in a large number of markets. This problem is frequently accentuated in countries that have an urgent need for emerging technology and yet may not have the processes established to facilitate timely equipment certification. National regulators from around the globe have put in place myriad and non-harmonized technical requirements over the past 50 years.[7]

[6] *Office of the U.S. Trade Representative's Jan. 8, 2004, press release announcing South Korea's elevation to the Priority Watch List. More information is available from http://www.ustr.gov/releases/2004/01/04-01.pdf.*

[7] *Telecommunication Industry Association (TIA) policy position on conformity assessment. More information is available from http://www.tialonline.org/policy/32.cfm.*

Leading Exporters and Importers in World Trade in Commercial Services, 2003

RANK	EXPORTERS	VALUE ($ Billion)	SHARE (%)
1	United States	282.5	16
2	United Kingdom	129.5	7.3
3	Germany	111.7	6.3
4	France	98.0	5.6
5	Spain	76.4	4.3
6	Italy	72.8	4.1
7	Japan	70.2	4
8	Netherlands	64.1	3.6
9	China	44.5	2.5
10	Hong Kong	43.2	2.5

RANK	IMPORTERS	VALUE ($ Billion)	SHARE (%)
1	United States	218.2	12.5
2	Germany	167.0	9.6
3	United Kingdom	112.4	6.4
4	Japan	109.7	6.3
5	France	81.6	4.7
6	Italy	74.1	4.3
7	Netherlands	66.2	3.8
8	China	53.8	3.1
9	Ireland	48.5	2.8
10	Canada	47.8	2.7

Source: World Trade Organization

One method of certification is the Supplier's Declaration of Conformity (SDoC), a self-declaration by a supplier[8] that indicates conformity to a technical standard or regulation. The SDoC is a procedure that allows a supplier to provide written assurance of conformity to the specified require-ments in a country.

A more broad approach is the establishment of Mutual Recognition Agreements (MRAs) between countries that are on a comparable level of technical development and have a compatible approach concerning conformity assessment. These agreements are based on the mutual acceptance of test reports, certificates and marks of conformity issued by the conformity assessment bodies of another country with the legislation of U.S.

RECOMMENDATION

Negotiate with trading partners to streamline other nations' conformity assessment processes and undertake agreements with the U.S. EIA supports the development of mutual recognition agreements (MRAs) for conformity assessment, whose purpose is to decrease costs and time delays while ensuring safety and reliability to consumers. Additionally, manufacturers' self-testing and the acceptance of a Supplier's Declaration of Conformity (SDoC) as proof of compliance to the receiving market's technical regulatory requirements are keys to the effective implementation of such market opening activities. ■

Standards

The U.S. government has recognized the importance to the national economy of technical standards developed by voluntary consensus standards bodies. Standards are essential to the U.S. competitiveness. Technical standards are written by hundreds of non-profit organizations in a nonexclusionary fashion, using thousands of volunteers from the private and public sectors. These bodies abide by the principles of openness, balance, transparency, consensus and due process.

A basic feature of the open standards process is the disclosure of relevant (or required) patents and/or patent applications, and an agreement to license patents on reasonable, nondiscriminatory

[8] *International Organization of Standardization and International Electrotechnical Commission,* General Criteria for a Supplier's Declaration of Conformity, *ISO/IEC Guide 22:1996*

(RAND) terms to any interested party. The disclosure may be mandatory or simply encouraged. The failure to disclose relevant (or required) intellectual property can put individual companies, an industry or the entire nation at a competitive disadvantage.

The U.S. government should act to ensure that technical standards remain open and that relevant patents are disclosed whenever disclosure is appropriate.

Overseas, there is documented evidence of standards being used as harmful non-tariff barriers to trade. In the case of China, this includes a law scheduled to take effect June 1, 2004 requiring that all WiFi/802.11-based products conform to a new proprietary Chinese security standard, known as the Wired Authentication and Privacy Infrastructure (WAPI). WAPI does not work with existing WiFi standards, and all foreign companies that want to sell products will have to partner with a Chinese vendor, which will own the IP. Such a standard, developed under the auspices of security, puts companies' IP rights in jeopardy and is utterly inconsistent with the spirit of China's trade commitments.

"An essential component of business today, regardless of a company's size, is open access to the emerging markets of the world."

Howard Witt,
Chairman and CEO, Littelfuse

RECOMMENDATIONS

Adopt U.S. policies that encourage and support the development of voluntary, open standards that promote innovation and the competitiveness of U.S. businesses. These standards should be consistent with the principles of due process and the protection of private intellectual property rights.

Encourage U.S. trading partners to develop similarly voluntary and open standards and to promote due process and intellectual property right protection. ■

Environmental Restrictions

The high-tech industry is the only industry whose products become smaller, cheaper, better, faster and more environmentally friendly year after year. EIA's corporate members proactively address environmental concerns and work to reduce the environmental impact of electronic products and manufacturing processes throughout their entire life cycle where technically feasible through policy and advocacy work and voluntary industry design for environment tools.

Because environmental policy is an area in which EIA has long been recognized as a national and global industry leader, we are particularly concerned about restrictions and standards in this arena. The increase in international product-related environmental restrictions threatens to harm the electronics industry by creating trade barriers, complicating design efforts, delaying the industry's access to markets, and creating new liability risks.

European governments continue to propose and enact legislative and

regulatory mandates that impose design requirements and impose extended producer responsibility on the electronics industry. These requirements ban the use of certain materials in electronics such as lead and mercury and also require manufacturers to fund the takeback of waste electronics. Although the rationale for these increased requirements is to promote environmental health and safety, no studies have concluded that electronic products pose a unique environmental risk. Similar requirements are now being proposed in other parts of the world. For example, electronics recycling requirements are growing in number in Asia.

Policymakers around the globe are examining the impact that the proliferation of electronic products has on energy use. In many cases, voluntary or mandatory programs have been established to limit the maximum allowable energy that certain products may use, or reward the most energy efficient products in a particular category. The most ominous policies involve "one-size-fits-all" energy consumption limits that do not account for product functionality or features.

In terms of global competitiveness, product design mandates impact companies' access to certain markets and unnecessarily force design changes that impede innovation. Differing or competing mandates may force manufacturers to design products for specific geographic regions, therefore increasing the costs to consumers and impeding job creation. The increasing number of potentially conflicting design restrictions creates uncertainty that innovative new products will be available in key international markets.

RECOMMENDATIONS

Promote international standards on product design. The high-tech industry is working to develop international standards to certify compliance with design restrictions limiting the use of certain chemicals. Once developed, the U.S. should recognize these standards and help promote them worldwide.

Promote voluntary energy programs such as Energy Star. Energy Star is increasingly recognized as the international symbol for energy efficiency. Any effort to increase energy efficiency in electronic products should be based on this voluntary program. ■

Currency Valuations

Most economists agree that the Chinese currency, the yuan, is undervalued against the U.S. dollar – perhaps by as much as 40% – giving an unfair advantage to Chinese manufacturers who can take

> ***"We must protect the engine that creates jobs. That engine includes well-educated employees, a climate that stimulates innovation and protects the resulting intellectual property and a strong infrastructure. The result will be the continuation of strong, U.S.-based entities that provide competitive products on a worldwide basis and more jobs in the U.S. "***
>
> Robert Goodman,
> CEO, Kentron Technologies

advantage of the weak currency as it makes their products cheaper and more competitive in overseas markets. While some in the U.S. argue that the yuan should be freely traded on the open market, EIA is concerned that forcing the Chinese to float the currency suddenly could have a highly adverse effect on the country's economy. In part, this is because the Chinese banking system is in need of serious reform before it could handle such a shock. U.S. Federal Reserve Chairman Alan Greenspan has also said, "A rise in the value of the [yuan] would be unlikely to have much, if any, effect on aggregate employment in the United States, but a misaligned Chinese currency, if that is indeed the case, could have adverse effects on the global financial market and, hence, indirectly on U.S. output and jobs."[9]

A quick revaluation might also be a blow to the country's successful exporters—many of which happen to be foreign-invested companies. However, it should be possible to raise the yuan's value gradually against the dollar without excessively harming exporters.

In looking at currency valuations, the currencies of other Asian countries should also be considered. The Malaysian ringgit is pegged to the dollar and protected by capital controls; the Hong Kong dollar is also tied to the dollar through a currency board. Officially, other Asian currencies float, but central banks have intervened in the foreign exchange market to hold down their currencies as the dollar has weakened. Since the dollar peaked in February 2002, it has fallen by a quarter in trade-weighted terms. But while the euro has risen by half against the dollar from its low in July 2001, the Japanese yen has risen by less than a fifth because of heavy intervention by Japan's central bank. Swiss bank UBS figures that the most undervalued Asian currencies are the yuan, the yen, the Indian rupee and the Taiwan and Singapore dollars; the least undervalued are the Malaysian ringgit, the Hong Kong dollar and the South Korean won.

One reason for the U.S. to take a moderate approach to this issue is that China and other Asian countries hold their reserves largely in U.S. government securities. If Asians stopped buying or began unloading these, the dollar would fall even faster and bond yields would rise. By buying government securities, Asian central banks are lending the U.S. cheap money, holding down U.S. interest rates and sustaining consumer spending – on Asian products, in some cases – and mortgage borrowing.

RECOMMENDATION

Encourage China to tie the yuan to a broader basket of currencies. This basket could include the euro and the yen as well as the dollar. China could then widen the band in which the yuan floats to allow appreciation. This would ensure that the yuan does not simply follow the dollar downwards. EIA also supports the efforts of the U.S. Treasury Department to work with China to develop a more flexible, market-based exchange rate policy. ■

[9] *Dec. 11, 2003, speech by Federal Reserve Chairman Alan Greenspan to the World Affairs Council of Greater Dallas.*

Policy Recommendations: Visa and Immigration Policy

chapter 2

Visa programs that allow foreign individuals to visit, work and study in this country provide immeasurable value to the United States. The U.S. has always attracted foreign-born scientists and engineers, and a number of the country's greatest scientific achievements have depended on these foreign nationals. For example, the scientists who left Germany after World War II helped form the core of the U.S. space program. In addition, international students contribute more than $12 billion dollars to the U.S. economy in money spent on tuition, living expenses and related costs.[1] The timely and efficient movement of people across borders facilitates foreign direct investment (FDI) in the U.S. and allows U.S. companies to compete in and lead in today's global markets, both of which translate into more U.S. factories, offices and jobs that contribute to a healthy economy and higher quality of life.

The majority of corporations and individuals utilizing visa programs do so for legitimate purposes, and it is imperative to find a balanced approach to the visa application process that does not punish those legitimate users. At stake for the U.S. is the ability to innovate and compete with the rest of the world.

EIA is primarily concerned in two key issues:
1. Maintaining a qualified workforce
2. Sustaining business with overseas customers

Security-Related Visa Measures

The unfortunate side effects of new and enhanced visa procedures since the events of Sept. 11, 2001, have made it significantly more difficult for the best and brightest minds in the world to enter the U.S. While we have long benefited by being a haven for foreign students and scholars, our openness has also made the nation more vulnerable to security threats.

With that in mind, both Congress and the Administration have made significant changes to the visa system in the past few years. Unfortunately, changes in visa policy and the specific ways those changes have been implemented have tended to make the visa process slower and more cumbersome. The most significant changes include:

Additional Security Checks: Visa applicants are much more likely than they were before Sept. 11 to be

[1] *Institute of International Education,* Open Doors 2003: Report on International Educational Exchange *(New York: IIE, 2003). Summary information available from http://opendoors.iienetwork.org/.*

subject to security checks. However, the government does not seem to have clear and consistent criteria to determine which visa applicants warrant a security check or how to determine whether an applicant presents a threat.

The security check process for those engaged in sensitive technologies is known as Visas Mantis, a procedure that was developed as a result of law enforcement and intelligence community concerns that U.S.-produced goods and information are vulnerable to theft. Visas Mantis affects visa applicants who seek to engage in a commercial exchange or academic pursuit involved in one of the critical fields of the Technology Alert List (TAL). The TAL includes nearly every associated technology or skill involving chemistry, biochemistry, immunology, chemical engineering and pharmacology, among other disciplines.

Visa Mantis procedures are not new, and they are intended to provide protection against industrial espionage and the transfer of sensitive technology rather than to counter terrorism. However, problems in the form of delays of months and outright denials dramatically increased in 2002. In many cases, this is likely because consular services are not fully knowledgeable of the technologies involved and are wary of letting anything slip past. Many of the industrial sectors covered in the TAL, including telecommunications, are largely decontrolled for purposes of export licensing, and the Visas Mantis system is being applied in a misdirected and ineffective manner.

As a result, officials are apt to send any technology-related application (critical or non-critical) to Washington for the multi-agency review known as Security Advisory Opinions (SAOs). This review is criticized as slowing the process unnecessarily. Companies report that the SAO process works expeditiously at the State Department and the CIA but that most of delays arise at the FBI, where it takes constant pressure (through the State Department) for someone to manually check the file, determine why it was held up and clear the application.

Personal Interviews: In August 2003,

Economic Impact of International Students

Total Number of Foreign Students:	586,322
Net Contribution to U.S. Economy by Foreign Students (2002-03)	
Contribution from Tuition and Fees to U.S. Economy:	$7,143,000,000
Contribution from Living Expenses:	$10,138,000,000
Total Contribution by Foreign Students:	$17,281,000,000
Less U.S. Support of 28.4%	- $4,908,000,000
Plus Dependents' Living Expenses:	+ $479,000,000
Net Contribution to U.S. Economy by Foreign Students and their Families:	**$12,851,000,000**

Source: Open Doors 2003, Institute of International Education Online Survey

U.S. Visa Application Rejection Rates, 1999-2003

	FY1999	FY2000	FY2001	FY2002	FY2003
B1/B2 Visas					
Total Applications	5,898,466	6,134,966	6,273,024	4,477,259	3,746,211
Visas Issued	4,358,130	4,406,396	4,237,596	2,904,781	2,556,350
Refusal Rate	26.1%	28.1%	32.4%	35.1%	31.7%
F1 Visas					
Total Applications	329,196	356,799	380,562	322,806	288,812
Visas Issued	262,515	283,471	293,357	234,322	215,694
Refusal Rate	20.2%	20.5%	22.9%	27.4%	25.3%

Source: U.S. Department of State's Bureau of Consular Affairs

Note: The B1 or B2 visa is for foreign citizens seeking to enter the U.S. temporarily for business (B1) or for pleasure or medical treatment (B2). The F1 visa is for students qualified to attend full-time colleges, universities, conservatories, academic high schools (subject to strict regulations) or any institution with language-training programs.

the State Department issued a new policy, requiring virtually all visa applicants, from all countries, to be interviewed in person by a consular officer. No additional funds were provided to consulates to meet this additional workload.

RECOMMENDATION

Improve the Visas Mantis process. EIA and its sector members support the February 2004 U.S. Government Accounting Office's report, which recommends that the Secretary of State, in coordination with the FBI Director, and the Secretary of Homeland Security, develop and implement a plan to:

- **Establish milestones** to reduce the current number of pending Visas Mantis cases;
- **Develop performance goals and measurements** for processing Visas Mantis checks;
- **Reinstate a time limit** within which "interested parties" such as the Defense Department and the FBI must respond to visa applications subject to the SAO;
- **Provide additional information, through training or other means** at consular posts, to clarify guidance on the overall operation of the Visas Mantis program, including when Mantis clearances are required, what information consular posts should submit to enable the clearance process to proceed as efficiently as possible, and how long the process takes; and
- **Work to achieve interoperable systems** and expedite transmittal of data between agencies. ■

Business Visitors

At a time when companies increasingly rely on international sales as a key component of growth and stability in the marketplace – sales that support high-paying jobs in the U.S. – the ability to bring customers and employees from other countries is critical. New restrictive visa application review policies that have led to pronounced delays and uncertainty in obtaining travel visas have degraded companies' ability to efficiently serve existing customers and effectively compete for new business. An additional difficulty for business is the inability to easily bring foreign national employees to the U.S. for training purposes or for business functions.

The timely and efficient movement of people across borders is as important as the free exchange of goods, services and capital in today's competitive global markets. The issue extends beyond merely international sales to relationships with overseas business partners, investors and suppliers. For example, overly restrictive visa requirements impact our nation's ability to attract foreign buyers who do business with

tens of thousands of entrepreneurial U.S. technology companies participating in trade shows here. The simple truth is that companies cannot sustain business with overseas customers under these circumstances.

Students and Scholars

About half of American post-graduate degrees in mathematics, engineering and computer science are awarded to foreign students. If the U.S. is unable to retain such homegrown talent, the failure will translate into economic loss. Also, foreign scholars require visas to attend scientific conferences in the U.S., where their contributions help U.S. scientists keep abreast of the most important developments in their fields.

There are some early indications that the new visa rules are discouraging foreign students from coming to the U.S., and there are numerous anecdotes of students and researchers needlessly running afoul of the new rules, with damage to their research as a result. In a 2003 survey[2] of 250 U.S. higher education institutions regarding foreign graduate students, 47% of respondents indicated a decline in applications by international students for autumn 2004. Among doctoral and research institutions, that rate reached 59%. Nineteen of the survey respondents were ranked among the 25 research institutions that enroll the most international students. The drop in applications is coming as other nations are competing more aggressively for students from outside their borders.

In a 2003 survey of 250 U.S. higher education institutions regarding foreign graduate students, 47% of respondents indicated a decline in applications by international students.

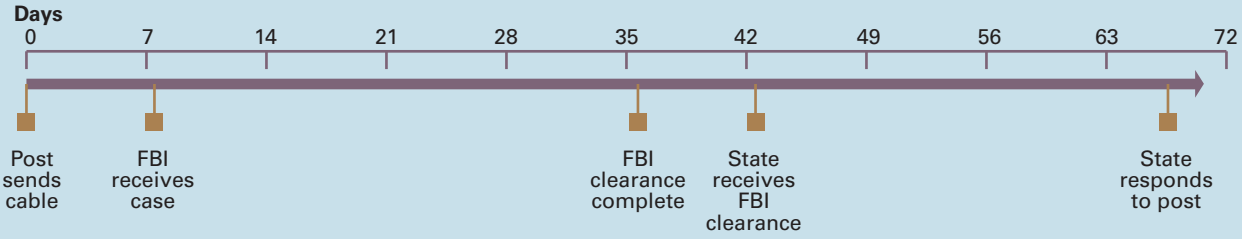
Temporary Workers

The H1-B classification applies to workers in a specialty occupation that requires highly specialized knowledge and a high level of training and education. The L-1 classification allows foreign nationals to transfer to the U.S. affiliate of the corporation for which they work. Due in part to increased media and political coverage of offshore outsourcing, the H1-B and L-1 visa categories have been the subject of growing concern. While some level of reform is justified, it is imperative that legislators not lose sight of the value provided by temporary workers and not disrupt the ability of companies to use these visa programs for legitimate purposes.

In the case of H1-B visas, gaining access to highly specialized talent is an important component of U.S. competitiveness. Nearly half of the people hired on H1-B visas have graduate degrees, while only 5% of the U.S. population has the same level of education. A large percentage of H1-B visa holders are, in fact, graduates of U.S. universities. This is not surprising

[2] *February 2004 survey conducted by the American Council on Education, the Association of American Universities, the Council of Graduate Schools, NAFSA: the Association of International Educators, and the National Association of State Universities and Land-Grant Colleges*

Average Time Frames for Visas Mantis Cases, April to June 2003



Note: Calculation of mean processing times and associated standards of error for sample of Visas Mantis cases.

Time Interval	Average processing time in days	Standard error in days	Number of completed applications	Range of processing time in days
Post sends cable and FBI receives case	7.9	2.3	71	1 to 82
FBI clearance complete	28.9	6.8	70	0 to 321
State receives FBI clearance	6.1	0.8	70	1 to 45
State responds to post	23.6	3.2	67	0 to 141

Source: GAO analysis of State Department documents and visa operations

considering the National Center for Education Statistics' figures, which show that approximately half of all post-graduate U.S. degrees in mathematics, engineering and computer science are awarded to foreign students. It is counterproductive for the U.S. to train foreign scientists and engineers and then send them home to compete against American businesses.

The L-1 visa program facilitates FDI in the U.S. Unless U.S. and foreign companies are able to bring key personnel to their American operations, U.S. companies will be put at a competitive disadvantage and foreign companies will be unlikely to establish or expand their presence in our country.

High-tech companies rely on the ability to move their talent around in order for employees to gain practical business experiences in different parts of the globe. In today's increasingly competitive business environment, movement of skilled personnel is fundamentally important to a company's strategic success, making the H1-B and L-1 visas more essential than ever.

RECOMMENDATIONS

Provide adequate funding and resources for streamlining the visa process and tracking statistics so that agencies can safely discriminate between those visitors who have demonstrated their trustworthiness and those who have not.

- **Provide the State Department with increased funding and the resources** necessary to schedule and conduct personal interviews in a timely manner. In addition, we encourage the State Department to ensure it has experienced and qualified personnel serving as visa officers.
- **Task the Department of Homeland Security with maintaining statistics** on L-1 and H-1B visas, including applications, approvals and extensions. This would ensure that the government knows how many visa holders are in the country and would better track workers who overstay their visas. Additional funding would also allow DHS to better train immigration service center personnel to reduce mistakes and streamline the processing of visa applications and extensions.
- **Task the State Department with tracking statistics** related to visas for scientists and engineers, including applications, approvals and expiration dates.
- **Task the State Department and DHS with fast-tracking the visa approval process** for known business, research

and education visitors, as well as U.S.-based foreign national employees. People who have been provided with visitor and employment visas in the past to participate in business or scholarly events and have not violated U.S. immigration laws should be issued expedited visas if their names do not appear on any of the nation's security watch lists. This fast-track approval system would allow our nation to conduct its international business and engage in collaborative trade and education exchanges with those who have demonstrated they possess legitimate interests for travel to the U.S. Those who do not qualify for expedited issuance can be then legitimately subjected to a thorough investigation before a visa is issued.

Strengthen enforcement of existing visa laws and regulations. With increased funding for oversight, the Department of Homeland Security, which oversees immigration services, would be better equipped to ensure that employees using these visas have the qualifications mandated and that abuse of the system is more difficult.

- **Clarify the definition of "specialized knowledge"** for L-1 visa programs. It is argued that there are too many loopholes that allow for workers who do not truly have the necessary technical skills or knowledge of the individual company sponsoring the visa.
- **Tighten the restrictions** on the L-1 visa category, denying L-1B status to "specialized knowledge" personnel if the foreign nationals would be (1) supervised and controlled by an employer who is not affiliated with the employer for whom the petition was granted and/or (2) placed with an unaffiliated employer to provide labor that does not involve the specialized knowledge specific to the petitioning employer. Tighter restrictions would also include an increase from the six months pre-employment requirement to one year for employers with approved blanket L petitions.[3]

"Perhaps the most worrisome aspect of the current situation is a growing perception that the U.S. is becoming a uniquely difficult and inhospitable place to conduct international business."

Gary Shapiro,
President, Consumer Electronics Association

Exempt from the H1-B cap foreign masters and Ph.D. graduates of U.S. universities, and allow for the portability of this exemption among companies. In addition, **provide a fast-track green card process** for foreign masters and Ph.D. graduates of U.S. universities employed by "qualified" U.S. companies in positions that clearly require advanced university studies, to keep them in the U.S., rather than impel them to immediately return to their home country. ■

[3] *U.S. Congress, Senate,* L-1 Visa (Intracompany Transferee) Reform Act of 2003*, 108th Congress, S. 1635 (Sept. 17, 2003). This legislation was introduced by Senator Saxby Chambliss (R-GA).*

Policy Recommendations: Workforce Assistance and Training

chapter 3

In a 2004 internal EIA survey, high-tech executives said that U.S. workers have an advantage over foreign workers in creativity, integrity, business acumen and innovation. Given optimal business conditions in both the U.S. and overseas, more than 90% said they believe their company would benefit most by keeping R&D, design, engineering and integration in the U.S. What this means is that the U.S. should focus on retaining and excelling at these higher-skilled, innovation-focused jobs.

For decades, U.S. workers have been taught to believe in a formula:

education and high skills + technology = high wages

That formula has been challenged as skilled and educated white-collar employees have seen their jobs fall away. It is vital that we strive to keep the "new" economic blueprint for emerging technology in the U.S. the same as the old one: we invent it and we perfect it, while the most routine or commoditized manufacturing occurs where it can be done most efficiently.

There is no doubt that free and fair trade is good. Since the initiation of the General Agreement on Tariffs and Trade (GATT) in 1948, global exports are up from $58 billion[1] to nearly $8 trillion in 2002[2], and U.S. exports will exceed $1 trillion this year.

The longtime mantra, "A rising tide lifts all boats," is no longer good enough, though. While the benefits of increasingly open borders are certainly widespread, the pain is clearly concentrated. Growth in international trade has served to raise the standard of living for millions of people around the world and to create new opportunities for consumers, but there are segments of the population that have been left behind.

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[1] *U.S. Department of Commerce,* Manufacturing in America: A Comprehensive Strategy to Address the Challenges to U.S. Manufacturers *(Washington: DOC, January 2004) 25.*

[2] *United Nations Conference on Trade & Development, The World Investment Report 2003,* FDI Policies for Development: National and International Perspectives *(New York and Geneva: UNCTAD/WIR/2003, September 2003).*

Assistance for Displaced Workers

While the 2002 Congressional debate over reforming the Trade Adjustment Assistance (TAA) program was hard-fought and contentious, there is now growing recognition on both sides of the aisle that displaced workers in both production and service industries need training and assistance.

However, it is also increasingly apparent that trade is not the sole cause of worker displacement. In fact, statistics indicate that only 2.6% of mass layoffs in 2003 were connected to foreign shifts and imports.[3] By any objective analysis, trade and offshore outsourcing are a small part of the overall job loss picture. Structural changes such as productivity and technological advancement have had a much more significant impact and will almost certainly continue to do so. Output per hour has risen at an annual rate of more than 4% in the past two years,[4] much higher than recorded in the recovery of the early 1990s.

Statistics indicate that only 2.6% of mass layoffs in 2003 were connected to foreign shifts and imports.

Structural changes in the U.S. economy mean that the bar has been raised for workers in all fields – including technology and telecommunications – and the system for ensuring people have the necessary skills must reflect that reality.

The TAA program of the past has focused heavily on the relatively short-term benefits that tide over manufacturing and production workers displaced by international trade until they can find a new job. But among the manufacturing workers displaced by trade between 1999 and 2001, only 26% found equal or better-paying jobs by 2002, and 26% took pay cuts of 20% or greater.[5] More emphasis must be placed on the importance of training workers for the higher-skilled jobs that will actually be available and necessary in the medium- and long-range future.

Furthermore, the very name of the Trade Adjustment Assistance program has become a relic of an earlier era, implying that "trade" equals "unemployment." While a name change itself may be viewed simply as a matter of semantics, the reasoning behind such a change is real. Employment levels rise and fall in various sectors for any number of reasons. What is important is how government and industry coordinate to accelerate the rises, minimize the falls and better prepare the workforce for the future.

While the U.S. Department of Labor also supports the Workforce Investment Act (WIA)[6], which covers a broader

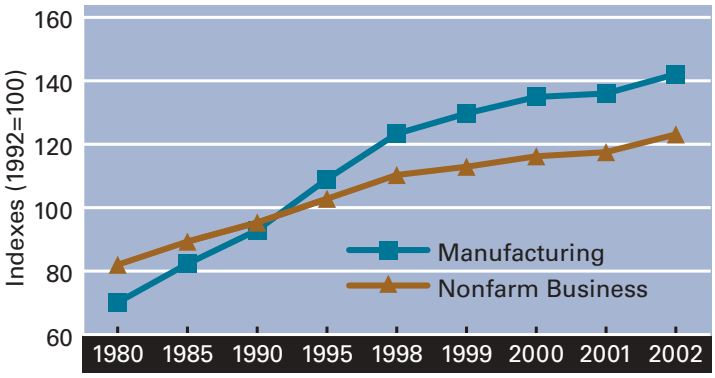
[3] *U.S. Department of Labor, Bureau of Labor Statistics,* Mass Layoff Statistics Homepage *(accessed March 2004); available from* http://www.bls.gov/mls/home.htm.

[4] *U.S. Department of Labor, Bureau of Labor Statistics,* Labor and Productivity Costs Homepage *(accessed March 2004); available from* http://www.bls.gov/lpc/.

[5] *U.S. Department of Labor, Bureau of Labor Statistics,* Worker Displacement*, 1999-2001; available from* http://www.bls.gov/news.release/disp.nr0.htm.

[6] *More information on WIA is available from* http://www.doleta.gov/usworkforce/wia/act.cfm.

U.S. Productivity Growth: 1980 to 2002



Source: Statistical Abstract of the U.S.: 2003

segment of displaced workers and is not tied to trade, WIA provides a much lower level of benefits than TAA. Benefits last for a shorter period of time; and there is no health insurance, no relocation allowance and no possibility of wage insurance. This program does not operate as an equivalent substitute for an expanded and revamped TAA.

RECOMMENDATIONS

Modernize, revamp and rename TAA as the Effective Workforce Assistance program to reflect the structural changes in the economy that mandate a workforce with higher skill levels. Effective Workforce Assistance would work through the Department of Labor's Office of the 21st Century Workforce to:

- serve all displaced workers, regardless of sector or displacement factor;
- coordinate more closely with industry at the local and federal level to develop worker training programs that reflect U.S. skills needs;
- offer workers over 35 the option of wage insurance; and
- provide for the portability of healthcare benefits and pension funds.

Subsidize displaced high-tech workers who go into K-12 math and science education, either as teachers or as classroom resources. Encouraging workers with science, technology, engineering and math (STEM) backgrounds to go into the teaching field could both strengthen the K-12 school system and use the skills of displaced workers. If this program were operated through the Effective Workforce Assistance program, it could include wage insurance and fast-track education certification.

While there would be increased costs involved in converting TAA to the Effective Workforce Assistance program, provisions such as expanded wage insurance will lower the outlay. Wage insurance costs less than training and is more relevant for those who would prefer on-the-job training from a new employer as a way of working their way up the career ladder. A system that more closely matches training to available jobs being offered by area companies will help lower the costs, as workers are likely to use the system for a shorter period of time before being hired. ■

Lifelong Workforce Development

In addition to providing relevant retraining for those workers who are displaced, it is essential that industry recognize the importance of continual training throughout its entire workforce, in order to keep pace with the ever-changing business environment. In many cases, the jobs previously viewed as the lowest rung on the ladder are no longer done in the U.S. That means American workers reaching for that rung will come up empty-handed unless they are provided with the tools to reach higher.

Because of the leaps made in telecom and technological development, companies are

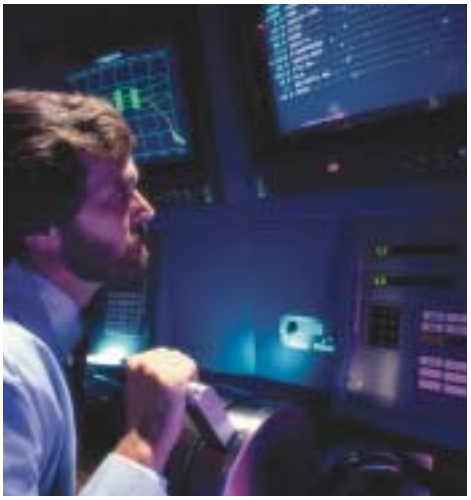
no longer tied to a few select locations – or to a particular continent. By distributing their operations around the globe, they can deploy resources around the clock and grow jobs in the U.S. and abroad. This always-on strategy means that many of the more routine jobs within the technology industry – even including software code writing – are now done in other countries.

RECOMMENDATIONS

Establish a national program of community college and industry partnerships to train students and mid-career workers for relevant technology careers. Federal seed money provided to community colleges would aid in the development of curriculum relevant to industry's needs, better ensuring that graduates are prepared for the jobs available. Industry involvement in building the curriculum, providing internship and co-op opportunities, and post-graduate hiring would better ensure that graduates enter or reenter the workforce with truly marketable skills.

> ***"The rapidity of innovation and the unpredictability of the directions it may take imply a need for considerable investment in human capital. "***
>
> Alan Greenspan,
> Chairman, U.S. Federal Reserve Board

Implement a "human capital" investment tax credit.[7] To help incumbent workers move up the career ladder and to prevent unemployment before it occurs, the federal government could provide companies with an increased incentive to train workers. Because companies cannot require workers to remain in their employ after training, there is reluctance in some cases to invest in providing a worker with higher skills that will then make them attractive to a rival firm.



A credit equal to 50% of a company's annual expenditure on training would mitigate this reluctance to some degree. The company would be the locus for the tax credit, and the educational institutions used for training would benefit, as well. ■

[7] *Catherine L. Mann, "Globalization of IT Services and White Collar Jobs: The Next Wave of Productivity Growth," International Economics Policy Briefs, No. PB03-11 (Washington: Institute for International Economics, December 2003).*

MAKING PARTNERSHIPS WORK: THE HOMER S. GUDELSKY INSTITUTE FOR TECHNICAL EDUCATION

The Homer S. Gudelsky Institute for Technical Education is a model community college-industry partnership program based in Montgomery County, Md.

One of several workforce development and continuing education centers established at Montgomery College, the Institute is a public-private joint venture providing state-of-the-art technical education and training opportunities for the local community. The programs are a direct result of ongoing partnerships with local business and industry to identify and respond to technical training needs. The Institute's facilities house 28 instructional laboratories, four classrooms, a conference center and faculty offices.

Named for a local philanthropist and area business leader, the Institute is funded through a leadership contribution from the Homer and Martha Gudelsky Family Foundation and through private contributions from many area businesses, individuals and foundations. The Montgomery County Government matched the contributions dollar for dollar.

■ ■

More information is available from http://www.montgomerycollege.edu/Departments/giterv/.

Policy Recommendations: U.S. Business Environment

chapter 4

Since its establishment, the U.S. has been a magnet for foreign investment and entrepreneurs. Our nation's business landscape has much to recommend it, and companies from around the world continue to take advantage of its benefits. The U.S. fosters new industries and innovation in many ways, and it takes seriously its responsibilities to workers and consumers.

With the fall of communism in Europe and the expansion of international trade and technology, more countries have attained economic freedom. Nations such as China, India, Mexico, the Philippines and Russia are eager to build their own booming industries, advance their education systems, move their workers up the skills ladder and provide new opportunities for their citizens. This young ambition poses a challenge to more established economies like the U.S. with entrenched systems. These countries and others like them have developed incentives that ease new market entry for businesses and enable lower production costs.

Complex Regulatory Overhead

While there is always a strong temptation to point to external forces first when facing a problem, many of the factors leading businesses to move operations away from the U.S. are, in fact, homegrown. The National Association of Manufacturers estimates that external overhead costs from taxes, health and pension benefits, tort litigation, regulation and rising energy prices add approximately 22% to U.S. manufacturers' unit labor costs relative to key foreign competitors.[1] For example, the cost of an employee's benefits, including health care and private pensions, is estimated to be 21% of total compensation. More disturbing, these additional structural costs are almost as high as total manufacturing costs in China.

External overhead costs from taxes, health and pension benefits, tort litigation, regulation and rising energy prices add approximately 22% to U.S. manufacturers' unit labor costs.

Companies in the U.S. are increasingly discouraged by these high costs and strict regulations, and foreign countries are often the beneficiaries of that discouragement. In an internal EIA survey earlier this year, nearly 60% of executives described the U.S.'s labor regulations as "costly," while only 20% considered them "fair."

[1] National Association of Manufacturers, "How Structural Costs Imposed on U.S. Manufacturers Harm Workers and Threaten Competitiveness", (Washington: NAM, December 2003). Comparison economies included Canada, China, France, Germany, Japan, Mexico, South Korea, Taiwan and the UK.

Other areas of regulation also play a significant role in increasing the costs for companies operating in the U.S. Expenditure by the federal government on writing and enforcing regulations nearly doubled between 1990 and 2003, from $13.7 billion to $26.9 billion.[2] Importantly, this rise also implies an increase in individual businesses' compliance costs. Regulations such as those from the Occupational Safety and Health Administration (OSHA), the recently implemented Sarbanes-Oxley Act on corporate financial reporting, and Superfund cleanup spending all add to the cost of doing business in the U.S.

> ***"We shouldn't take our preeminence as the world's greatest economy for granted. We've constantly got to make sure the economic environment here is strong. "***
>
> President George W. Bush

There are certainly powerful arguments in favor of many of the U.S.'s regulations, and consumers and workers alike benefit from many of the reforms and improvements implemented. These laws have worked to create the high standard of living that those in the U.S. enjoy and that is the envy of much of the world. However, the sheer volume of these regulations, their myriad layers and their compliance costs have also created a landscape that is increasingly expensive and burdensome for businesses. When it comes to regulations, one size does not fit all, and many of the rules in the U.S. are inflexible and overly proscriptive. Regulatory burdens and cost are not the only reasons companies shutter operations in the U.S., but it is certainly a factor.

RECOMMENDATIONS

Use Congressional power to review and reject new regulations more aggressively. The Congressional Review Act of 1996 requires agencies to send all final regulations to Congress for review. By a simple majority in both houses, rules deemed inappropriate can be disapproved. Increased use of this oversight power would be a positive way in which Congress could quash unnecessarily costly or burdensome rules.

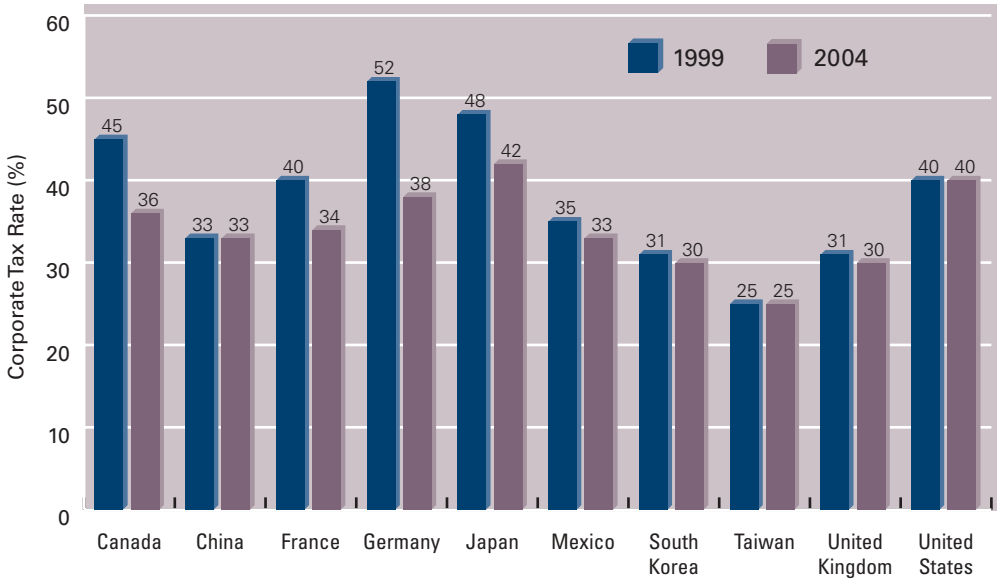
Require review of proposed state regulation and legislation to determine impacts on small businesses and whether there are alternate means to achieve the same results. There are currently 14 states considering legislation that would require agencies to review existing regulations to find less costly alternatives for small businesses. ■

Corporate Tax Rates

It is not just developing nations such as China and India that are capturing lost U.S. business. Ireland has been the fastest-growing Western country of the past decade, as the result of a concerted effort to attract capital and people by reducing taxes – its corporate tax rate has fallen from 36% in 1997 to 12.5% – regulatory burdens and government spending. In addition, the Irish government sought to improve its education system, and it created developed policy that

[2] *Ibid.*

Corporate Tax Rates Around the World, 1999-2004



Source: KPMG Corporate Tax Rate Surveys (1999 and 2004)

encouraged one of the world's leading high-speed communication systems. These are all factors that businesses look for in determining where to establish operations.

Throughout most of the economic downturn of the past three years, surveys have continued to indicate a relatively steady level of consumer spending but a significant downturn in corporate investment and capital expenditure. Despite this evidence, however, most tax solutions signed into law have been directed at relief for individuals. Business confidence and spending on equipment and research led the surge in productivity and in the economy during the 1990s, but the pendulum swings both ways. The primary drag on the current recovery is the lack of sustained capital spending and job growth.

The U.S. corporate tax rate is the second-highest in the world, lower than only Japan's. Seven years ago, both Canada and Germany had significantly higher rates than the U.S. – at 44.6% and 57.4% respectively – but they have since aggressively reduced these rates and increased their attractiveness to business investment. The U.S.'s corporate tax policy continues to put domestic companies at a significant competitive disadvantage and provides them with a huge incentive to earn and keep as much of their cash as possible in other countries.

RECOMMENDATION

Encourage measures that simplify U.S. tax policy and minimize cases of double taxation. Special preferences and penalties throughout the code increase the cost of compliance for corporations. In addition, rules on worldwide earnings and foreign tax credits currently serve to overburden companies. ■

Tax Incentives for Business Investment

There is a long history of governments employing various tax incentives on both a sector- and economy-wide basis to encourage the establishment of facilities and other forms of capital investment. Internationally, China employs a number of "tax holidays" and other special tax treatments on a provincial and a national basis to encourage new investment. In recent years, these incentives have eased because of their budgetary impact, but many still operate on a provincial basis. Closer to home, most of Canada's provinces have targeted programs to provide tax incentives – often on an ad hoc basis and particularly targeting software and other high-tech sectors – to encourage the construction of new facilities.

RECOMMENDATIONS

Pass the Homeland Investment Act/Invest in the USA Act. A study by J.P. Morgan estimates that a one-year, 85% reduction in corporate tax on foreign earnings could lead to a $300 billion U.S. inflow. Current law provides strong incentives for multinationals to keep earnings from foreign operations offshore, but this immediate and significant infusion of cash would be used by many companies to invest in the U.S. economy through debt reduction, increased capital spending and research and development.[3]

Implement an employment tax credit. As a way of encouraging domestic employment, the federal government should provide a tax credit for a company's net full-time new hires of permanent workers in the U.S. To ensure that the employment is not short term only, companies would receive the credit 12 months after each hiring. ■

State Environments for Business and Innovation

Some actions taken by individual states have resulted in environments that are inhospitable to business operations, and thus discourage local business investment and innovation. Ohio, for example, has dealt with its budget deficit not by cutting state spending but by implementing new taxes, tax increases and new fees. In addition, states are increasing taxes and changing the tax code under the auspices of "closing loopholes," in some instances. Last year's Massachusetts budget included $500 million in fee increases various licenses and purchases, according to one analysis, and changes in the tax code raised another $128 million.

A number of surveys have noted the strong correlation between those U.S. states that have lost the most jobs and those that have particularly burdensome tax and regulatory schemes for businesses. In Massachusetts' case, the unemployment rate was unchanged from January 2003 to January 2004 at 5.6%; in Ohio, the rate rose over the course of the year to 6.2% and is higher than the national rate.[4]

OFT-CITED EXAMPLES OF STATE AND LOCAL REGULATORY BURDENS AND INCENTIVES

Burdens

- Multiple and overlapping tax structures from state to state
- Taxes on revenues and not profits
- Unreasonable and misplaced environmental requirements
- Uncontrolled tax increases, often related to real estate valuation changes
- Local tax structures less applicable to certain newer technology sectors (e.g. taxes on intangible technology products)

Incentives

- Long-standing and strategic tax relief, rather than one-time abatements
- Tax credits for hiring workers with certain skill levels or needs
- Assistance with specialized purpose-built infrastructure, particularly focused on increased or specialized productivity (e.g. shared bio-production facilities)
- Non-financial international trade and partnering assistance, particularly for small and medium-sized enterprises
- Workforce development done in consort with industry clusters
- Real bridges between sources of capital and need, especially in "emerging" sectors

■ ■

Source: Arlington (Va.) Economic Development

[3] *U.S. Congress, Senate,* Invest in the U.S.A. Act of 2003*, 108th Congress, S. 596 IS1S (March 11, 2003) and U.S. Congress, House,* Homeland Investment Act of 2003*, 108th Congress, H.R. 767 IH (Feb. 13, 2003). S. 596 was introduced by Senators John Ensign (R-NV) and Barbara Boxer (D-CA), and H.R. 767 was introduced by Rep. Philip English (R-PA).*

[4] *U.S. Department of Labor,* Regional and State Employment and Unemployment Summary: January 2004 *(Washington, DC: Bureau of Labor Statistics, 2004).*

On the flip side, states often cited as among the most business friendly, including Missouri, Nevada and Virginia, have unemployment rates lower than the national average. While this sort of correlation is not an exact science, it is useful in examining the incentives and burdens that vary from state to state.

A recent study[5] in California found that just under 60% of business leaders interviewed have policies to restrict job growth in the state or move jobs to other locations in the U.S. Respondents cited compliance costs, the threat of lawsuits and delays in obtaining permits that hamper operations as deterrents in the state. Officials say the potential costs for California businesses from four key issues on the November 2004 state ballot – touching on commercial property taxes, workers' compensation rates, increased health care coverage mandates and lawsuits – could add more than $20 billion per year to corporate bottom lines.[6] In some cases, states may not technically raise taxes, but by eliminating exemptions they accomplish the same disincentive landscape for businesses. States in need of revenue find it much easier to win voter approval for increased corporate taxes than for higher taxes on individuals. But placing the burden on industry is hardly worth the lost business: corporate income tax typically makes up just 5% to 10% of state tax collections, according to Michael Lippman, head of KPMG's state and local tax practice. The bulk of states' money comes from property tax, sales tax and the individual income tax.

> ***"The starting point is setting a strong national policy, making technology and innovation leadership a critical – if not essential – economic focus for this country. "***
>
> John Deslinger, Executive Vice President,
> Murata Electronics North America

In addition to taxes, many states place regulatory burdens on companies that discourage business. For example, the electronics industry has been fighting design regulations in the multiple states for a number of years, and electronics recycling requirements are growing in number. Most notably, the industry has focused on proposed restrictions on the use of mercury in electronic products in the New England states and recycling requirements in California.

Differing or competing mandates may force manufacturers to design products for specific geographic regions, therefore increasing the costs to consumers and impeding job creation. The increasing number of potentially conflicting restrictions and regulations creates uncertainty that innovative new products will be available in all markets.

RECOMMENDATIONS

Base federal funding of state Innovation Extension Partnership (IEP) programs[7] on measurements of states' business environments. Tiered levels of funding could be made available as states reached specific goals designed to make their regulatory and tax policies more business friendly. To ensure that all states have an incentive to improve their landscape, the winners each year would become ineligible for funding for the next three years. Sunsetting this program after 10 years would provide states with an incentive to make swift improvements and gain eligibility in three separate funding cycles.

Prevent inconsistent state recycling requirements through a

[5] *Bain and Company,* California Competitiveness Project: An Assessment of California's Competitiveness *(Sacramento, CA: Bain and Company, February 2004).*

[6] *Jim Evans, "Businesses seek united ballot front,"* Sacramento Bee*, Feb. 11, 2004.*

[7] *The proposed Innovation Extension Partnership is as an expanded version of the Manufacturing Extension Partnership, as recommended by EIA in Chapter 6.*

comprehensive national program. Differing state recycling requirements for manufacturers harm interstate commerce and increase costs. A comprehensive, industry-supported national recycling program is needed to prevent a piecemeal state-by-state approach. Therefore, the Administration and Congress must demonstrate leadership by making federal electronics recycling legislation a priority.

Eliminate and prevent state environmental design requirements. Electronic products contain certain chemicals that provide unique functionality and often product safety benefits, but legislation has been proposed or enacted in some states that will restrict the electronics industry's use of these chemicals. This legislation will force product design changes that could impact product functionality, product longevity and potentially increase the overall environmental impact. To avoid inconsistent design requirements and barriers to interstate commerce, the federal government should promote voluntary national programs on environmental design, such as the U.S. Department of Energy and Environmental Protection Agency's Energy Star Program.

Support a "physical nexus" clarification for states to impose a business activity tax (BAT) on non-resident businesses. Some states have become increasingly aggressive in pursuing novel tax collection methods, including charging BAT to companies with "economic nexus," which can include merely selling goods to a customer in the state or sending employees to a conference or media event. Legislation to clarify a requirement of physical nexus would ensure certainty for businesses and minimizing unnecessary litigation.[8] ■

Broadband Infrastructure

There is cause for concern over the U.S.'s declining position in broadband penetration and the resulting effect on our international competitiveness. EIA has for years warned that ubiquitous and robust broadband is essential to our nation's ability to compete in the global marketplace. The President's statement in March 2004 supporting a national goal of extending broadband to all Americans by 2007 was an important step in raising the level of U.S. commitment. On the other hand, key destinations for business investment, including India, Malaysia and the Philippines, have been active in developing national broadband

[8] *U.S. Congress, House,* Business Activity Tax Simplification Act of 2003*, 108th Congress, H.R. 3220 IH (Oct. 1, 2003). This legislation was introduced by Reps. Bob Goodlatte (R-VA) and Rick Boucher (D-VA).*

deployment plans, and that effort is beginning to bear fruit.

On the basis of our membership's experience as equipment suppliers and through our review of widely circulated studies and reports, we believe the U.S. still has a long way to go in providing ubiquitous broadband availability. A 2003 study[9], for example, indicated that rural areas still lag considerably behind urban and suburban areas in that regard. Clearly, as long as this situation persists, rural Americans will suffer a significant disadvantage in terms of the economic and social benefits that could be enjoyed through a wide range of broadband services.

The U.S. essentially invented Internet technology, but we must continue to invest in it if we want to ensure our citizens' role in a competitive global economy. We've seen that countries that recognize technology as a critical part of their economic future and that designate broadband deployment a national priority make huge strides. According to the Organization of Economic Cooperation and Development, the U.S. fell in 2003 to 10th in the world in broadband penetration behind countries such as South Korea, Canada, Iceland and Japan.[10]

Two years earlier, we ranked fourth.

Some of the key factors in South Korea's take rate include early adoption by the government of a comprehensive broadband policy, deregulation of market entry and pricing, and fierce competition. Support for making deployment a priority came from the top – from Korea's president – and the government built the national broadband backbone, judging that widespread use of broadband was in the national interest.

In 1999, Canada connected all the schools and libraries in the entire country to the Internet – including the 10% who live in the most remote areas. The government made it clear that getting its citizens connected and keeping them competitive was a huge priority. In line with its goal of making Canada the most connected nation in the world, the government has offered tax incentives and said the key is public-private partnership where necessary.

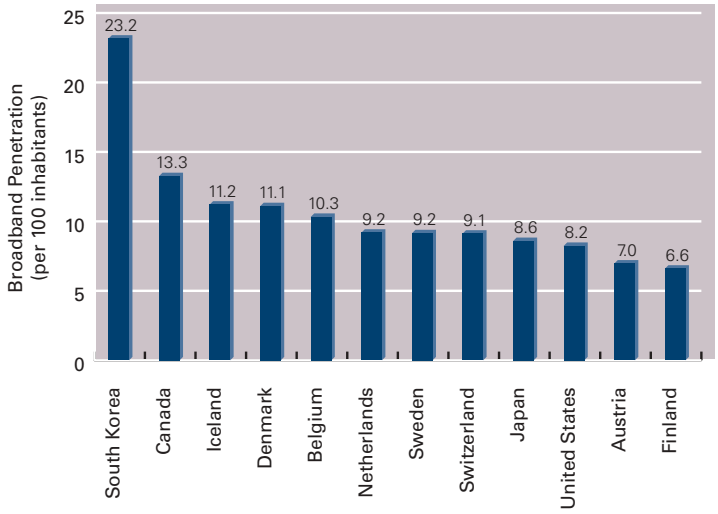
A number of other countries are starting to jump ahead by deploying "next-generation" broadband – extremely fast networks that can deliver high-quality video, data and voice services. Japan, for example, set a national goal of serving 10 million residents

> ***"Broadband capability would equip every American with the critical tools necessary to compete in the 21st century, tools that would make them far more productive, secure, and enhance their standard of living."***
>
> Matthew Flanigan, President,
> Telecommunications Industry Association

[9] *John B. Horrigan, "Broadband Adoption at Home: A Pew Internet Project Data Memo," Pew Internet & American Life Project (Washington: Pew Research Center, May 2003).*

[10] *Organisation of Economic Co-operation and Development,* Broadband Update*, Committee on Information, Computer and Communications Policy (Paris: OECD, Oct. 2-3, 2003).*

Broadband Penetration Around the World, June 2003



Source: Organisation of Economic Co-operation and Development

with 100 megabits by the end of 2005. Fiber-to-the-home subscribers there grew from 12,000 in January 2002 to 200,000 at the end of that year – 1,700% growth in 12 months. By the end of 2003, the Japanese total had surged to 895,000. By contrast, only 20,000 Americans had a direct fiber connection at the end of 2002, and the growth of fiber-to-the-home is much lower here.

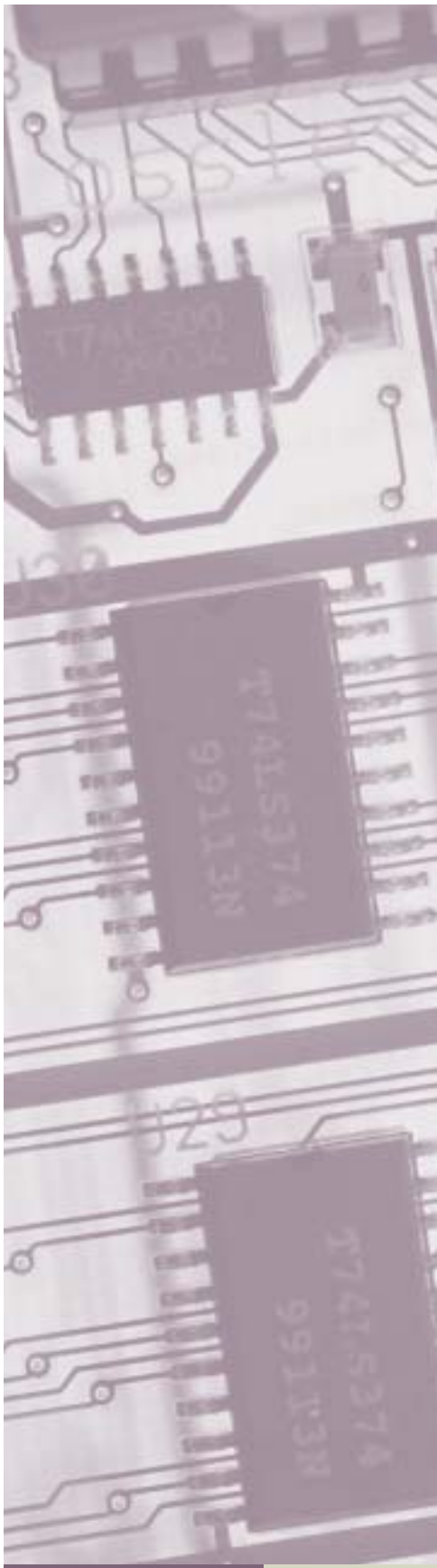
These comparisons are important because next-generation broadband could give other nations a significant economic advantage over the U.S. Their workers will be more efficient, and their companies will be able to develop new products such as software, web services and computer chips that we can't.

The U.S. must take action and assume a front-running role in achieving widespread broadband deployment within a reasonable period of time. A national broadband policy and strategy for deployment should include technology-neutral incentives for investment, increased spectrum allocation for advanced wireless services and the prevention of barriers for new market entrants. In addition, the Federal Communications Commission's (FCC) current policy of not regulating access to cable companies' high-speed networks should be codified.

> ***"The rest of the world treats our industry as an investment in the future. The United States treats our industry as, 'You have always been here, you'll always be here, so let's raise taxes.' "***
>
> Craig Barrett, CEO, Intel

RECOMMENDATIONS

Task the Administration with developing a national broadband policy and implementation strategy. The overriding objective of



this public-private partnership should be to ensure that all Americans have access to high-speed Internet access technologies in the immediate future.[11]

- Affordable, highly advanced and secure communications services should be available to all Americans.
- Competitive market forces, not regulation, should be the principal means of achieving this goal.
- Governments should intervene only where such intervention (1) is necessary to effectively address a specific, critical problem and (2) is targeted and otherwise designed to minimize disruption to competitive market forces.
- Governments should make available the necessary radio spectrum for the deployment of advanced communications services.

Implement tax credits or expensing to encourage broadband providers to extend and upgrade their networks. A 10% tax credit for current-generation broadband investment in rural and underserved areas and a 20% credit for next-generation investment, or an equivalent tax expensing option, would make a positive contribution to the economy, improve workplace efficiency and bring new services to communities.[12] ■

[11] Recommendations based on the policy position of the Telecommunications Industry Association (TIA), a sector of EIA. More information is available from http://www.tiaonline.org/policy/broadband.cfm.

[12] U.S. Congress, Senate, 108th Congress, S. 160 (Jan. 14, 2003); U.S. Congress, Senate, 108th Congress, S. 905 (April 11, 2003); U.S. Congress, House, 108th Congress, H.R. 768 (Feb. 13, 2003); and U.S. Congress, House, 108th Congress, H.R. 768 (Feb. 13, 2003). S. 160 was introduced by Senators Conrad Burns (R-MT) and Max Baucus (D-MT), and S. 905 was introduced by Senator John Rockefeller IV (D-WV). H.R. 768 and H.R. 769 were introduced by Reps. Philip English (R-PA) and Robert Matsui (D-CA).

chapter 5

Few industries are as acutely aware of the need for science, math, engineering and technological (STEM) proficiency in our nation's workforce as the electronics industry. One of the fundamental concerns among U.S. high-tech business leaders and owners today is that fewer students are entering the workforce with the skill sets necessary to continue America's strong tradition of innovation and technological advancement. This includes not only basic STEM proficiency, but also the ability to continuously build upon that proficiency to meet the evolving demands of the marketplace. Technology is evolving so rapidly that the skills of an electrical engineer can become obsolete within three years.

While a higher proportion of students graduate from high school with advanced courses in mathematics and science than did their counterparts three decades ago, relatively few are attaining levels deemed proficient or advanced. The performance of U.S. students continues to rank substantially below that of students in other, especially Asian, countries. Furthermore, the relative performance of U.S. students compared to their counterparts in other countries appears to decline as students progress through school, and it also affects the most advanced students.[1]

By the time they enter college, U.S. students are already at a considerable disadvantage to develop the knowledge and skills required in a globally competitive science and engineering workforce. Many students enter postsecondary education institutions lacking the reading, writing, or mathematics skills necessary to perform college-level work.[2]

To state it bluntly, the U.S. primary and secondary education system is not producing graduates with sufficient preparation to become the high-skilled, globally competitive workers needed to keep the U.S. innovation system going.

> ***"A 100-year-old curriculum is being used by 98% of high schools."***
>
> Dr. Leon Lederman,
> Director Emeritus, Fermi National Accelerator Laboratory, and Pritzker Professor of Science, Illinois Institute of Technology

[1] *National Science Foundation, Division of Science Resource Statistics,* Science and Engineering Indicators 2002 *(Arlington, VA: NSB 02-01, April 2002).*
[2] *Ibid.*

The current infrastructure is woefully equipped, under-motivated and insufficiently accountable to prepare and transform children into technologically savvy adults who can compete favorably against their counterparts from other nations in the global economy of the 21st century. If such a situation is allowed to continue, the effect on the U.S. innovation and technology system will be detrimental. Job losses in the U.S. will continue, and there will be significant downward pressure on wages. Companies that are unable to find qualified workers in the U.S. to take on highly technical and specialized responsibilities will be forced to maintain their competitive edge by outsourcing high-end operations to countries that do possess a well-educated workforce.

It is imperative that American STEM education become aligned with the practical needs of American high-tech businesses. For far too long, the vital connection between classroom knowledge and real-world relevance has been neglected. Students – and, equally important, teachers – must have the opportunity to understand how math and science skills translate from the blackboard to the circuit board. The nation needs a business community tied to the K-12 education system, and a K-12 education system whose curriculum will help create workers who thrive in the 21st-century business world.

"The Next Big Thing"

In addition to ensuring that our students are well prepared for the high-skilled careers that will drive the U.S. knowledge economy of the future, we also have to get them genuinely excited about the role of science and technology in their world. Industry and government must work together to drive children's interest and fuel their imagination.

Pursuit of national "grand challenge" goals along the frontiers of science provides an opportunity to make science real as new discoveries are advanced in a variety of science and technology disciplines. For the electronics industry, advanced research in superconductor technology, a new generation of information technologies and nanotechnology are revolutionizing design and providing the basis for commercial innovations that improve healthcare, make better use of natural resources, provide cleaner manufacturing, and create cheaper, cleaner, more widely available energy.

Just as the U.S. space exploration program in the 1960s helped spur a generation of children into scientific fields, these and other explorations of scientific frontiers and their emerging commercial applications can be made accessible to today's primary and secondary students.

> ***"If we want to remain competitive, we should learn from the U.S. experience of creating an entire generation of engineers and scientists through the positive motivation of the space program."***
>
> Mark Hughes, President,
> System and Network Solutions Group, SAIC

HOW U.S. EIGHTH-GRADERS COMPARE TO STUDENTS FROM OTHER NATIONS

Mathematics		Science	
Nation	*Average*	*Nation*	*Average*
Singapore	604	Chinese Taipei	569
Korea, Republic of	587	Singapore	568
Chinese Taipei	585	Hungary	552
Hong Kong SAR	582	Japan	550
Japan	579	Korea, Republic of	549
Belgium-Flemish	558	Netherlands	545
Netherlands	540	Australia	540
Slovak Republic	534	Czech Republic	539
Hungary	532	England	538
Canada	531	Finland	535
Slovenia	530	Slovak Republic	535
Russian Federation	526	Belgium-Flemish	535
Australia	525	Slovenia	533
Finland	520	Canada	533
Czech Republic	520	Hong Kong SAR	530
Malaysia	519	Russian Federation	529
Bulgaria	511	Bulgaria	518
Latvia-LSS	505	United States	515
United States	502	New Zealand	510
England	496	Latvia-LSS	503
New Zealand	491	Italy	493
Lithuania	482	Malaysia	492
Italy	479	Lithuania	488
Cyprus	476	Thailand	482
Romania	472	Romania	472
Moldova	469	Israel	468
Thailand	467	Cyprus	460
Israel	466	Moldova	459
Tunisia	448	Macedonia, Republic of	458
Macedonia, Republic of	447	Jordan	450
Turkey	429	Iran, Islamic Republic of	448
Jordan	428	Indonesia	435
Iran, Islamic Republic of	422	Turkey	433
Indonesia	403	Tunisia	430
Chile	392	Chile	420
Philippines	345	Philippines	345
Morocco	337	Morocco	323
South Africa	275	South Africa	243

Source: Trends in International Mathematics and Science Study (TIMSS) 1999
Note: Finland's ranking may appear incorrect, but statistically it is accurate, according to compilations done for the "Trends in International Mathematics and Science Study 1999 International Science Report: Findings from the International Association for the Evaluation of Educational Achievement's Repeat of the Third International Mathematics and Science Study at the Eighth Grade."

Average is significantly higher than the U.S. average

Average does not differ significantly from the U.S. average

Average is significantly lower than the U.S. average

Public/Private Partnerships

EIA has long worked to develop a partnership environment for private industry and public schools so that a high-tech, experiential education becomes the foundation of U.S. technical competence, innovation and economic development. Through our foundation, the National Science & Technology Education Partnership (NSTEP), EIA supports the TechXplore program, which recruits technology experts from our corporate members to serve as mentors for teams of middle school and high school students.

TechXplore creates a competitive high-tech business environment in the classroom and over the Internet, tasking each team with solving a real world problem or addressing a quality of life issue using technology related to their mentor's company. Once the research process is complete, each student team creates a website to present their results, which often include a concept for a new technology application or new product. In short, TechXplore introduces students to the skills most critical to their success in our increasingly technology-driven economy. It also gives them both the time and opportunity to perfect those skills, in a curriculum, after-school or extra-curricular setting.

Across the U.S., companies of all sizes have begun to address the critical need for a strong, highly skilled workforce in STEM fields, devoting time and resources to local initiatives that create valuable partnerships with public schools. For example, the Industry Initiatives for Science and Math Education (IISME), a consortium of San Francisco Bay Area companies in partnership with the University of California at Berkeley, focuses on teachers as the primary agents for effecting meaningful change in mathematics and science education. Since 1985, IISME has provided teachers with experiences and tools they need to adapt their practices and change their schools so that all students are prepared to be lifelong learners, responsible citizens, and productive employees.[3]

By harnessing the energy of the business community and cultivating the initiatives that really make a difference, the federal government could have a significant role in expanding and replicating the success stories.

RECOMMENDATIONS

Require industry involvement in the U.S. Department of Education's Math & Science Partnership (MSP) program. The current MSP grants require partnerships between high-need public schools and the STEM departments of colleges and universities. Business involvement is optional at this point but should be made mandatory to ensure that the learning process is geared towards real-world skills development for both students and teachers. Incentives for such business involvement could include:

- **Provide federal seed money** to businesses to fund the first two years of STEM partnerships with K-12 schools. By encouraging individual companies to develop new programs with local schools, the federal government would foster a creative system from which it could harvest "best practices." An awards system to identify the most

[3] *Industry Initiatives for Science and Math Education (IISE), "About IISME" (accessed March 2004); available from http://iisme.org/AboutIISME.cfm.*

EIA MEMBER COMPANY PARTNERSHIPS FOR EDUCATION

Dell
To support the Earn and Learn technology training program in Denver's public school system, Dell donated 500 refurbished computers and continues to work closely with the district on a national rollout. The school system matches commitments from private partners with time, instruction, facilities and dollars. So far, students have increased their GPAs and their attendance.

Henkels & McCoy
Henkels & McCoy's TechBridge program for economically disadvantaged high school students employs a combination of work-based education, work readiness, occupational skills training, incentives and recognition to increase school attendance and raise math and reading levels. A key component of TechBridge is teaching the students how to build a personal computer and allowing them to keep the unit when they complete the program. On average, the students have improved by one grade level in math and one grade level in reading skills in the course of an eight- to 12-week program.

Honeywell
In partnership with NASA, Honeywell has developed "FMA Live! Where Science Rocks," – named after Sir Isaac Newton's Second Law: Force equals Mass times Acceleration – to engage middle-school students in the wonders of science, technology and math through innovative education programs that demonstrate the relevance of the natural sciences to children's daily lives. FMA Live! addresses critical science curriculum objectives that enable students to better understand science and help improve their performance. Over the next three years, the program is expected to reach about 125,000 students in more than 150 middle schools in 100 communities.
(http://www.nasa.gov/audience/forstudents/58/features/F_FMA_Live_2004.html)

Nortel Networks
Nortel Networks' Kidz Online (NNKOL) program is a nonprofit educational organization dedicated to preparing K-12 students and teachers to live and work in the information age through innovative peer-to-peer technology training distributed using advanced digital technologies. Through online lesson plans, technology skills are integrated into core academic subject areas. The unique NNKOL curriculum and teaching approach appeals to a wide range of users including those in traditional classrooms, faculties in schools of education, personnel in after-school programs, instructors in job training initiatives, students in technology camps, and within science museum educational outreach efforts. (http://www.kidzonline.org/)

Panasonic
Through its Partnership Program, the Panasonic Foundation establishes long-term (typically five-to 10-year) relationships with school districts to build their capacity to design, implement and sustain systemic reform. Panasonic does not fund its partner districts directly but rather provides them with extensive technical assistance, primarily through a network of consultants, many of whom are or were educators and who have first-hand experience with the reform challenges that the districts are trying to meet. The foundation formed includes not only the district's superintendent, central office staff and school board, but also unions and associations, teachers and administrators, parents and other community partners.
(http://www.panasonic.com/MECA/foundation/foundation.html)

Texas Instruments
TI's vision for education is broad based. Particularly in preschool and K-12 education, the company looks to create opportunities for fundamental change by developing programs that can be replicated elsewhere. Among these programs are Teachers Teaching with Technology (T3), which seeks to revolutionize the way math and science are taught in secondary schools; and Chip Camp, a partnership with community colleges to attract high school students to careers in the technology industry. (http://www.ti.com/tifoundation)

THIEL Audio
THIEL Audio invites any teacher and their students, regardless of grade level, to tour its manufacturing facility, interact with its staff, and engage in discussions about how THIEL got started. The goal is to help build a bridge between the world of school and the world of business and trade with the hope of teaching both teachers and students about the free market, the benefits of globalization, and how their understanding of this economic system can lead to a more prosperous and more fulfilling life.
(http://www.thielaudio.com/THIEL_Web/Pages/hotnews2.html)

successful programs in each state would allow these ideas to trickle up to the federal level and be replicated in other locations. Seed money in the first two years would allow a business to get its program underway.

- **Give partial rebates** that allow companies with longer-term STEM partnerships to submit receipts for the money spent on such programs. For reimbursement approval, companies would be required to document and assess their work with teachers and students using agreed upon metrics.
- **Establish tax credits** for business expenditures on direct contributions, including equipment, that aid STEM education in K-12 schools.

Encourage new STEM-oriented teachers and ensure experienced teachers' skills are strengthened. There are a number of incentives that can be offered to K-12 educators, including:

- **Support summer co-op programs in high-tech fields.** By partnering teachers with high-tech companies, a summer work experience program could expose educators to innovative career areas and demonstrate the hands-on technical and scientific knowledge their students will need. One month in a high-tech internship would encourage an application-oriented curriculum back in the school that includes basic and applied sciences, business practices and technical know-how.
- **Provide a 10% tax credit** for K-12 STEM teachers against qualifying undergraduate tuition expenses.
- **Establish low-interest loans or loan forgiveness** from the Department of Education for STEM college and university graduates who take jobs in K-12 STEM education.

Require school districts to consult a board of industry representatives on STEM and business curriculum, and skills requirements. By including the voice of industry, schools would better ensure that students were being provided with relevant knowledge and experience. ■

Accountability and Competitive Markets

Many states have decried the No Child Left Behind Act as an unfunded mandate, and it is true that the federal budgets since the Act's implementation in 2002 have not included full funding. However, throwing money at the education system is not the answer. Public school spending per pupil has more than doubled – even when adjusted for inflation – from $3,331 in 1965-66 to $8,194 in 2000-2001[4] , while reading scores have remained essentially stagnant and math scores have deteriorated. The key is not how much money is spent but *how* it is spent.

An important element missing in the equation has been accountability by schools and by teachers. No Child Left Behind was touted as the key to increased accountability because it mandated standard setting and testing requirements. However, the states are permitted to set their own standards for identifying failing schools, which clearly has the perverse effect of initiating a race to the bottom. Any state that sets the standards high enough to ensure children actually graduate from high school

> ***"Due to the decades-long decline in proficiency by American students in the sciences, the near-monopoly the U.S. has enjoyed in technological innovation is clearly at risk. Our long-term global comparative advantage hinges in large part on our ability to produce a significant population of extremely well-educated and well-trained individuals in math, technology and the sciences."***
>
> Kathy Gornik,
> President, THIEL Audio Products

[4] *Rod Paige, U.S. Secretary of Education, "More Spending is Not the Answer,"* USA Today, *10 January 2003.*

with relevant skills and knowledge faces the risk that many of its schools will fail.

In addition, as with previous reforms that have implemented statewide standards, teachers have not always been provided clear guidance or professional development regarding the goals of instruction. Nor do schools yet have access to top-quality curriculum materials aligned with the standards. Furthermore, assessments and standards are not always tightly linked, and the implied performance incentives for students, teachers and administrators vary across states. As well, there is concern that schools spend too much time "teaching to the test," which often focuses on facts, even though the associated standards – as well as the practical skills required in the science and engineering workforce – call for complex scientific inquiry and analysis developed through hand-on experimentation.

Because 100% of students are required to achieve the specific goals under No Child Left Behind, advanced students may get the short end of the stick while schools spend extra time on the basics and remedial skills.

National education reforms such as No Child Left Behind are meant to address a persistent problem within the U.S. educational system: the misalignment between objectives for school performance and the incentive system for achieving those objectives. No Child Left Behind, along with state standards-based reform laws, in many cases requires school districts to create options for parents, especially parents whose children are in schools where performance objectives are not being met.

Competitive coexistence is a key driver of innovation and excellence in business, and we believe there must be a similar spirit injected in to the public school system in the U.S. The stunning success of the free markets is one of the cornerstones of our country, but the best features of this system have not been applied enough in our schools.

Providing alternatives within the school system is not necessarily a new idea; many public school districts have long had alternative or magnet schools, for example. However, as individual parents and communities increasingly look to a variety of mechanisms to promote effective learning, a highly politicized debate has arisen around whether and how public funding should be used to support this school choice. Unfortunately, the losers in this type of polarizing debate are our children, and this must not be allowed to happen.

RECOMMENDATIONS

Encourage state provisions that allow taxpayers to direct money on their income tax returns towards specified education-related programs, facilities, institutions or districts. Such a provision would not cost the government any revenue and would allow taxpayers to designate the recipient of their tax-free contribution.

Encourage policies that promote school choice for K-12 students and their parents. Allowing the "consumers" of the school system to spend their education dollars on the programs they choose would encourage improvement throughout the system.

Require significant changes to the No Child Left Behind Act in order for its 2008 reauthorization. There is concern that the federal testing requirements under the Act have initiated a "race to the bottom" at many schools, and modifications must be made to ensure that this does not continue. First among the changes needed is **reform of the grant system.** The layers of bureaucracy involved in applying for grant money have worked to deter would-be applicants. ■

Policy Recommendations: Research and Development

chapter 6

Research and development (R&D) plays a vital, foundational role in facilitating commercial innovation through scientific and technological discovery. The commercial innovations that drive our economic growth and prosperity begin with scientific and technological knowledge generated through R&D. The work of commercialization centers on the development and engineering needed to implement this knowledge to create new products and services.

Key technologies that EIA technology leaders consider to be drivers of the next wave of U.S. commercial innovation (e.g. WiMax, digital rights management technology, fourth-generation (4G) wireless, convergent networks) have their roots in both federal-funded basic R&D and industry-funded applied R&D. For example, WiMax, the wireless metropolitan-area network standard to make broadband network access widely available without the expense of stringing wires, is one of many technologies and associated products and services developed by industry based on ongoing R&D to address foundational and theoretical aspects in wireless networks and mobile communications. Much of that fundamental R&D is supported through funding by federal agencies such as the National Science Foundation (NSF) and the Defense Advanced Research Projects Agency (DARPA).

The U.S.'s leadership in facilitating and capturing the economic benefits of innovation has two cornerstones: fostering broad R&D activity and creating an environment that facilitates commercial innovation of R&D results. This strategy has drawn increasing study and emulation by other countries. Japan, the European Union (EU) and, more recently, China have made considerable progress in successfully adapting features of the U.S. innovation model in an attempt to gain parity with or even challenge the U.S. competitive edge in innovation.

These and other countries, in particular Canada and India, have proven themselves adept at crafting incentive systems, adapted to their own economic imperatives, to attract direct foreign investment in development and, increasingly, applied or even basic research. Given these incentives, combined with improved quality of foreign university systems and their graduates escalates, the U.S.'s longtime advantages in the R&D arena begin to have a lesser impact on companies' decisions about R&D center location.

Structural changes in the U.S. and world economies are raising challenges to the robustness and sustainability of the American system to foster the R&D and related

R&D INCENTIVE PROGRAMS BEYOND THE U.S.

A number of nations have made great strides in R&D investment. For example:

Canada provides significant R&D tax credits, government support for technology companies, funding for projects – such as the $128 million NanoTechnology Centre in Edmonton, Alberta – and grants from the government and Canada's National Research Council. In some cases, R&D work performed in Canada could save a company 80% vs. that performed in the U.S.

Since **China**'s accession to the WTO, it has successfully used two complimentary strategies to attract record foreign direct investment (more than $50 billion in 2002):

1. preferential tax policies and incentives to qualified companies and activities, and
2. setting up development zones for accommodating new and high-tech businesses.

In **India**, certain software companies that locate in Hyderabad receive numerous financial benefits, including income tax holidays, exemptions from customs and excise duties and accelerated depreciation rates on computer equipment.

Pending EU approval, **Ireland** will begin providing an R&D tax credit of 20% of capital and revenue expenditure in 2004, in addition to its already-low 12.5% corporate tax.

commercial innovation. From ensuring adequate funding of basic R&D; to providing a coherent system of economic incentives and partnerships to facilitate commercialization; and to creating and maintaining the legal, regulatory and policy frameworks that enable regional technology-based economic development, federal policies and funding have been slow to adapt. For the industries represented by EIA, these are priority areas that must be addressed by policymakers to ensure continued commercial innovation and new job creation.

Federal Investment in Basic R&D

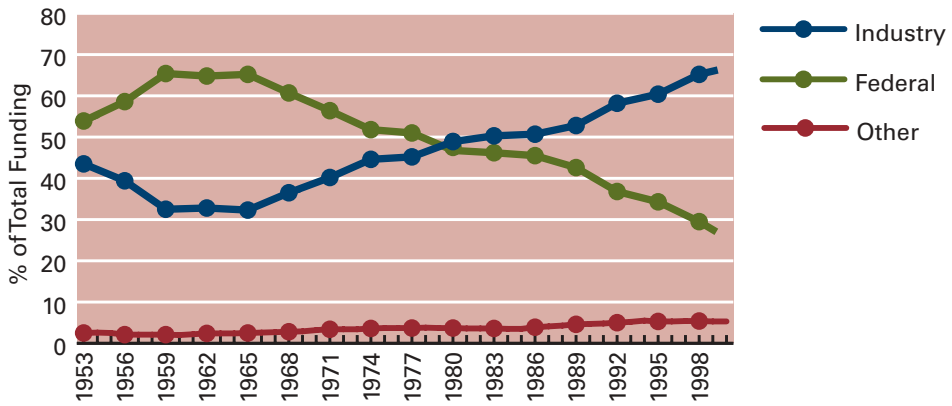
Industry accounts for about 68% of total U.S. R&D expenditures, with three-quarters of that investment going to late-stage development and engineering. Typically, less than 10% of industry R&D expenditures are directed to basic research. Firms participating in the Industrial Research Institute's (IRI) annual survey[1] of R&D investment trends indicated that they plan to decrease overall R&D spending in 2004, a continuation of a downward trend (adjusted for inflation) noted in the survey since 2000. Business models based on global competition, increased pressure for shorter time to market and declining revenues make it difficult for companies to invest either time or money in R&D, especially for large-scale, long-term corporate research that was the model in the days of Bell Laboratories.

Even so, the bottom line value of investing in R&D for next-generation innovations has never been more apparent. A Harvard Business Review study of high-tech firms shows that incremental innovations bring in 62% of revenue but only 39% of profits. On the other hand, next-generation innovations – which represent only 14% of product launches and 38% of revenue – generate 61% of profits.[2]

[1] *Industrial Research Institute,* Research Technology Management *(Washington: IRI, Jan/Feb. 2004).*

[2] *Sophie Rovner, "Bad News for 2004 Investment in R&D," Chemical and Engineering News 81, no. 51(2003): 13.*

Share of U.S. R&D Spending, 1953-2000



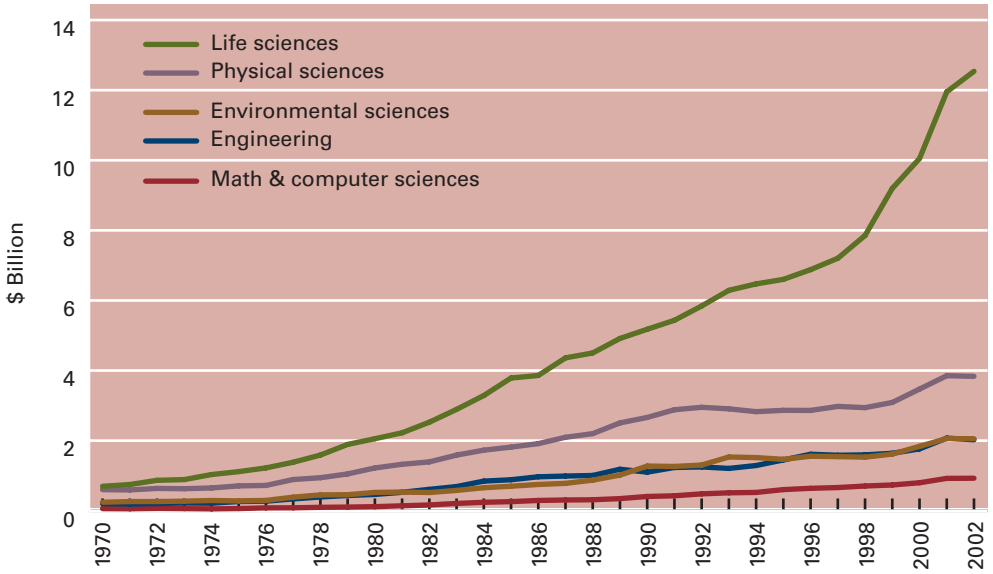
SOURCE: National Science Foundation/Division of Science Resources Statistics

Thus, industry is increasingly depending on federal support of basic R&D to seed the pipeline for commercial innovation. Companies in the IRI survey indicated that more strategic focus on contacts with federal labs, participation in joint ventures and alliances for R&D, and involvement in pre-competitive consortia with academe and industry partners. More than 65% of the primary funding for these and other basic R&D activity comes from the government and other non-profits. Federal funds represent about 60% of total R&D spending in U.S. universities and colleges, which perform nearly half of the nation's basic research.

> ***"Starting a company in Silicon Valley is back to the '70s, very challenging and difficult to raise additional venture funding. Start-up companies are looking for new ways to reduce costs, either by outsourcing or new tax incentives combined with government programs to help get their product to market. "***
>
> Dan Gatti,
> President, The Gatti Group

Against this backdrop, EIA is concerned about inadequate R&D funding requested in the Administration's FY2005 budget. Although the budget proposes record funding, much of it is directed towards defense and homeland security. The FY2005 request would cut by 16% the Department of Defense's (DOD) basic R&D accounts (6.1 and 6.2), which include key federal contributions to the support of the physical sciences, engineering and other research fields. Proposed funding for non-defense R&D agencies is flat or declining. These agencies, combined with DOD's basic R&D investments, fund nearly all of the federal investment in the non-biomedical sciences, including the physical sciences, engineering, mathematics, computer sciences, non-medical life sciences, environmental sciences and social sciences. Many of these areas are foundational for driving innovation in high-tech industries. Appendix 1

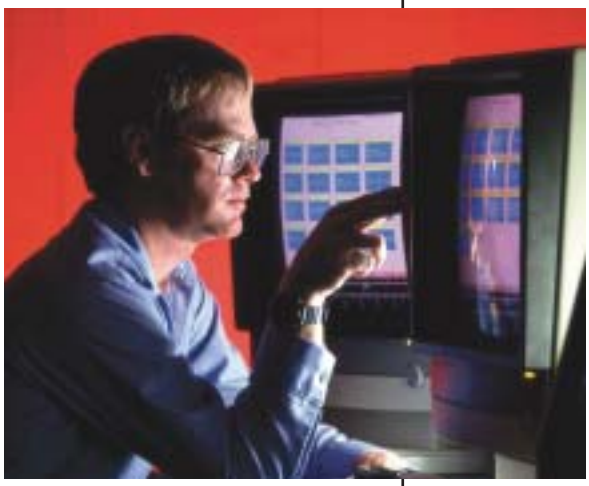
Federal Obligations for Basic Research, by Field: FY1970–FY2002



SOURCE: National Science Foundation/Division of Science Resources Statistics

presents more detail on how the budget proposal impacts funding for basic R&D important to EIA sectors.

Industry also looks to the federal investment in basic R&D at universities and colleges to support training of new generations of scientists, engineers and researchers. The federal investment in basic R&D provides support for undergraduate, graduate and post-doctorate education, contributing to the creation of a highly skilled, competitive workforce in science and engineering. EIA shares the concerns expressed by leadership of the Congressional science committees that the proposed FY2005 R&D funding could hinder the U.S.'s ability to maintain its world leadership role in science and technology with the proposed spending levels.



Of additional note is the heavy reliance on foreign-born scientists and engineers that developed over the last decade of the 20th century. As other countries and regions build up their indigenous science and technology capabilities, experienced scientists and engineers, particularly those originally from Asia, are returning to their native countries. Visa restrictions also require that many foreign-born scientists who complete degrees in the U.S., and otherwise would be sought for employment by U.S. labs and businesses, return to their countries. EIA's recommendations for addressing the adverse impact of current visa policy on science and technology higher education and the work-force are discussed further in Chapter 2.

RECOMMENDATIONS

Support longer-term funding of a more balanced portfolio of basic science and engineering research, to include adequate funding of physical sciences, engineering, mathematics, computer sciences, non-medical life sciences, environmental sciences, and social sciences, with a more informed process for assessing priorities and providing balance across fields to better facilitate innovation.

- **Make the basic research components of Function 250** (the portion of the budget that includes the Department of Energy's Office of Science, the NSF and NASA) **a top priority** in the FY2005 budget as called for by Rep. Vernon Ehlers.[3]
- **Provide funding for DOD S&T accounts at 3% of the total FY2005 defense budget**. Support of these vital programs, which include basic research (6.1), applied research (6.2) and advanced technology development, will demonstrate commitment and leadership in an area critical to U.S. national security. Past research funded by S&T programs has provided the foundation for protecting U.S. military personnel and ensuring U.S. technological superiority on the battlefield.
- **Increase the FY2005 funding level for the NSF by 15% over the FY2004 enacted budget, in line with Congress and the Administration's commitment to this agency.** Although NSF accounts for only 4% of federal R&D spending, it supports nearly 50% of non-medical basic research at colleges and universities, funds research in new frontiers of scientific inquiry and contributes to creating a highly skilled, competitive workforce in science and engineering. The Authorization Act of 2002 approved a five-year period of 15% annual budget increases for the NSF, and we urge this increase in the FY2005 budget.
- **Increase appropriations for the DOE Office of Science** consistent with proposed funding levels in the Energy Bill (H.R. 6). The DOE Office of Science is the largest funder of the physical sciences and a key funder of engineering, life sciences, environmental sciences, mathematics and computing.
- **Support the National Vision for U.S. Space Exploration and the FY2005 NASA budget request.** Over the past decade, NASA has been operating under tight fiscal constraints. The NASA budget went from $14.3 billion in FY1993 to a low of $13.6 billion in FY2000, to $14.9 billion in FY2002, representing a 13% decrease in purchasing power. During the Apollo program, NASA budget represented almost 4% of the federal budget, but since the early 1970s, it has remained at 1% or less. The FY2005 budget request asks for a sensible increase in the NASA budget and lays out a sound blueprint for the agency's future that properly focuses it on the long-term path necessary for successful space exploration and discovery. ■

Partnerships and Economic Incentives

Several federal public-private partnership programs help to

[3] *Feb. 11, 2004, statement on the Federal R&D Budget for Fiscal Year 2005, before the U.S. House Committee on Science.*

encourage innovation and accelerate the pace of commercialization of new technologies. These programs help stimulate pre-competitive research and overcome technical risks and financial barriers associated with early-stage technology development and bringing technology to market. They are the source of an estimated 20-25% of all funds for early stage technology development and also serve as an important mechanism to stimulate firm and job creation.

Key federally funded technology partnership programs include the Manufacturing Extension Partnership (MEP), the Advanced Technology Program (ATP), and the Small Business Innovation Research Program (SBIR). Each of these programs is being adversely impacted under the proposed FY2005 R&D budget. Appendix 2 provides additional information about the proposed budget impact on these programs.

In addition to funding partnership programs, since 1981 the federal government has provided industry with a tax credit for "research and experimentation" investments. Commonly referred to as the R&D tax credit, this helps mitigate the risks

> ***"In a digital world, strong R&D is critical to success."***
>
> Robert Struble, CEO, Ibiquity

associated with undertaking longer-term research, including timelags in realizing returns on investment, which often are not easily captured by a single company. These risks can translate into general underinvestment in the core research needed to drive commercial innovation. The R&D tax credit was initially a temporary measure but has received 10 extensions since its inception. The most recent extension is set to expire in June 2004, and despite considerable support within the business community and Congress, legislation to make the tax credit permanent is still pending.

RECOMMENDATIONS

Restore funding for key technology partnership programs, provide permanent economic incentives, and undertake program reforms to accelerate commercialization of R&D results.

Restore funding in the FY2005 National Institute of Standards & Technology (NIST) budget, both for laboratory programs (including funding for the advanced metrology laboratory, nanoelectronics and nanomanufacturing) and for the extramural programs, MEP and ATP.

- **Restore MEP funding to FY2003 levels** in order to strengthen and promote innovation among small and medium-size manufacturers as they adapt to structural changes in the economy.
- **Restore ATP funding to FY2003 levels** in order to continue encouragement of industry investment in high-risk, long-term R&D.

Strengthen and permanently extend the R&D tax credit.[4] EIA has long supported this measure, and Congress has endorsed the credit by extending it 10 times since its enactment, but the lack of a permanent credit causes uncertainty and could result in decisions by some to locate future projects offshore, where R&D policies are more generous and stable.

Raise funding levels for Phase I and implement, within in all SBIR funding agencies, fast-track procedures to eliminate time lags between Phase I and Phase II award cycles. Timelags in SBIR award cycles, plus the modest financial awards relative to the actual needs of today's small business innovators (especially in biotechnology and advanced electronics) hinder rather than help small

[4] *U.S. Congress, Senate,* Investment in America Act of 2003*, 108th Congress, S. 664 (March 19, 2003) and U.S. Congress, House,* Investment in America Act of 2003*, 108th Congress, H.R. 463 (Jan. 29, 2003). S. 664 was introduced by Senators Orrin Hatch (R-UT) and Max Baucus (D-MT). H.R. 463 was introduced by Reps. Nancy Johnson (R-CT) and Robert Matsui (D-CA).*

companies facing capital shortages and global competition. (See Appendix 2 for additional information.) ■

Clusters for Technology-Based Economic Development

Regional clusters for innovation and economic growth currently serve as the basis for many regional and national strategies for technology-based economic development. Innovation clusters are generally defined as geographic concentrations of competing and cooperating companies, suppliers, service providers, and associated institutions. Examples of clusters tracked[5] in the U.S. include Silicon Valley (information technology), Research Triangle Park (pharmaceuticals and biotech), Seattle-Tacoma-Bremerton (aerospace) and Detroit (automotive).

Clusters affect competition in three broad ways: first, by increasing the productivity of companies based in the area; second, by driving the direction and pace of innovation; and third, by stimulating the formation of new businesses within the cluster.

Studies indicate that economic productivity and innovative output are strongest where regional or national clusters are cultivated to include anchor institutions or organizations accompanied by a system of key supporting elements: workforce development, technology leadership, start-up support and infrastructure. Anchor organizations typically represent both R&D and advanced development, manufacturing or knowledge-based services. Promoting and strengthening U.S.-based clusters of innovation is essential to the nation's ability to produce high-value products and services that support high wage jobs.

An internal EIA survey of executives reveals that more than half are still undertaking most of their basic and advanced R&D work and their product design in the U.S. However, more than half of those who said foreign countries have tried to recruit their business were offered incentives such as competitive partnerships with universities or government agencies and the benefits of high-tech clusters. These incentives will continue to tempt companies' business if the U.S. cannot compete and foreign countries are successful in replicating our successful innovation ecosystem.

RECOMMENDATIONS

Strengthen and give greater flexibility to the ability of the private sector to collaborate with and commercialize government-funded research, especially at universities, national laboratories and other federally funded research and development centers, to enhance creation and/or growth of U.S.-based regional clusters.

Provide greater formalization and consistency in technology transfer oversight, accountability and practices enabled through key technology transfer legislation such as the Bayh-Dole and Stevenson-Wydler Acts of

[5] *Harvard University, Institute for Strategy and Competitiveness, Cluster Mapping Project, http://data.isc.hbs.edu/isc/cmp_overview.jsp.*

1980.[6] EIA agrees with the President's Council of Advisors on Science and Technology (PCAST) assessment that this legislation works and should not be altered. However, there is much variability and, in some cases, considerable complexity in implementation and accountability.

Extend and expand upon the success of the Manufacturing Extension Partnership model to create an Innovation Extension Partnership (IEP) to promote and enhance states' capacity to cultivate regional clusters for technology-based economic development. Similar to MEP, the objective of the new IEP would be to create a nationwide network of not-for-profit centers funded by federal, state, local and private resources. Centers would be tailored to enhance the state or regional ability to leverage local expertise, resources, and networks to create an environment for investments in R&D and commercial innovation.[7]

Criteria for IEP funding would include **assessment of the states' business and technology transfer environments**, with an emphasis on promoting best practices in providing flexible and non-burdensome regulatory and tax environments. (See Chapter 4 for examples.) Tiered funding would allow for capacity building in states not yet able to achieve best practices; eligibility cycles would be crafted to ensure that all states have an opportunity to compete for and receive funding. Sunsetting this program after 10 years would provide states with an incentive to make swift improvements and gain eligibility in three separate funding cycles. ■

[6] Bayh-Dole, Stevenson-Wydler and their successive amendments have helped to provide a favorable, uniform patent and licensing environment for transfer of government-funded inventions to the private sector for commercialization. A summary of these and related technology transfer legislation can be accessed at http://intramural.nimh.nih.gov/techtran/legislation.htm.

[7] Recommendation based on policy advocated by Lori A. Perine, Interpretech, LLC, in private interviews based on forthcoming white paper, March 2004.

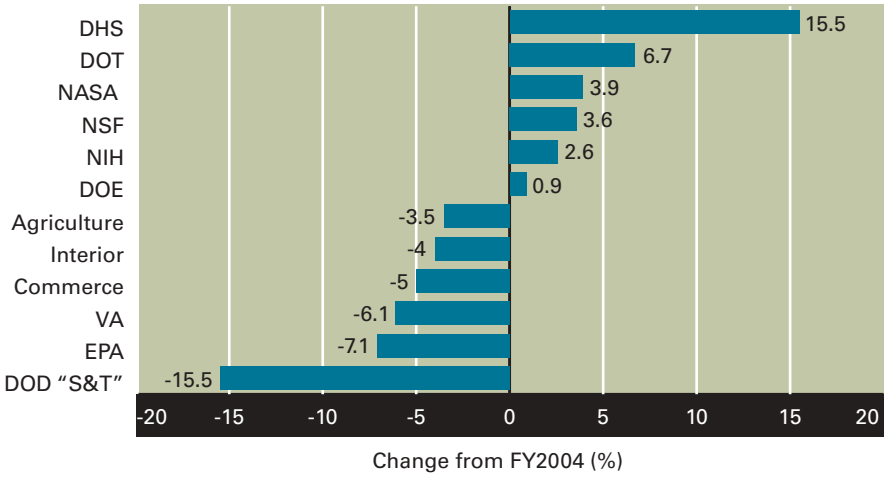
appendix 1

Summary of Proposed FY 2005 Federal R&D Funding[1]

President Bush's FY2005 budget proposal released on Feb. 2, 2004, proposes record funding for federal R&D due to large increases in defense and homeland security R&D. With tight constraints on other discretionary spending, most federal R&D programs would see flat funding, cuts, or increases barely above the expected rate of inflation (1.25%). The entire 4% increase requested for FY2005 would go to Department of Defense (DOD) development of weapons systems and R&D in the new Department of

R&D Authorization Changes in the FY2005 Budget, by Agency

Total R&D (Conduct and Facilities)



Source: AAAS, based on OMB data for R&D for FY 2005, agency budget justifications, and information from agency budget offices.
Note: The projected inflation rate between FY 2004 and FY 2005 is 1.25 percent.

Homeland Security (DHS), leaving all other federal R&D programs collectively with declining funding. Looking only at basic research, the federal portfolio would grow by a modest 1% or just $258 million to $26.8 billion, but federal support of basic research excluding the National Institutes of Health (NIH) would fall 1.9%.

[1] *Summary based on detailed analysis of the President's R&D budget undertaken by the American Association for the Advancement of Science (AAAS), available from http://www.aaas.org/spp/rd/prel05p.htm.*

For defense R&D, nearly all of the increases in the past few years have been in weapons systems development, "6.4" or higher in the DOD classification system. DOD's science and technology (S&T) investments ("6.1" through "6.3"), comprising basic and applied research and technology development, are still well below the funding levels of the late 1980s and have received relatively modest increases. The FY2005 request would cut DOD S&T by nearly $2 billion or 16%.

The DOD S&T accounts fund all of DOD's investments in research, including key federal contributions to the support of the physical sciences, engineering, and other research fields, including graduate and post-doctorate education. DOD basic research investments in these areas have been critical to the growth of the electronics industry over the past two decades.

Non-defense R&D funding levels have been driven primarily by the recently completed campaign to double the NIH budget between 1998 and 2003. All the other non-defense R&D funding agencies collectively have seen their budgets barely increase over the past decade, with even the modest increases in the past few years coming mainly from the creation of DHS.

Non-NIH agencies, combined with DOD's S&T investments ("6.1" through "6.3), fund nearly all of the federal investment in the non-biomedical sciences, including the physical sciences, non-medical life sciences, environmental sciences, engineering, mathematics, computer sciences, and social sciences. The federal investments in these areas also provide support for undergraduate, graduate, and post-doctorate education in these fields. Federal support for these disciplines has remained stagnant for more than a decade.

The FY2005 budget continues this trend. For example, although President Bush signed an National Science Foundation (NSF) authorization bill in December 2002 that called for its budget to double over five years, the NSF budget would fall short of the mark with a budget of $5.7 billion, up 3% after similar increases in the past two years but well short of the $7.4 billion envisioned in the authorization. Although NSF accounts for only 4% of federal R&D spending, it supports nearly 50% of the non-medical basic research at colleges and universities, funds research in new frontiers of scientific inquiry and contributes to creating a highly skilled, competitive workforce in science and engineering. Most of the other agencies in the federal R&D portfolio would see steep cuts or at best modest increases in their R&D funding.

Members of Congress have expressed concerns about the level of federal R&D funding proposed in the Administration's FY2005 budget. However, they note fiscal pressures (the U.S. economy, war and the ballooning federal deficit) that leave little room for increasing funding for research. Congressional leaders have drawn attention to critical underfunding in the budgets for the Department of Energy's Office of Science, the NSF and NASA.

EIA sectors also have raised concern about the funding request for laboratories and extramural programs at the National Institute of Standards & Technology (NIST). The FY2004 appropriation cut the funding for NIST's Manufacturing Extension Partnership (MEP) by more than 65 %. Manufacturers throughout the country have expressed dismay that the FY2005 request did not seek to restore this cut. In addition, the FY2005 budget proposes to eliminate a second NIST program, the Advanced Technology Program (ATP), which currently has a budget of $170 million. The ATP, which began in 1990, has used to award grants to the private sector to encourage long-term investment in high-risk, innovative technology R&D. As of last September, the program had awarded 709 grants worth approximately $2.1 billion. About half of the projects research areas funded have been in the electronics, computer hardware, communications or IT fields. The Administration said the money eliminated from the ATP would be shifted to other NIST programs or to DHS. ■

appendix 2

Key Federal Technology Partnership Programs

The Manufacturing Extension Partnership (MEP) is a nationwide network to provide small and medium-sized manufacturers with the technical and business expertise and services tailored to their most critical needs. The program helps small firms overcome barriers in locating and obtaining private-sector resources, strengthens and promotes innovation and supports worker training. Since its inception, MEP has assisted more than 149,000 firms. The FY2004 appropriation cut funding for MEP by more than 65%, and the FY2005 request fails to restore this cut.

The Advanced Technology Program (ATP), which began in 1990, awards peer-reviewed grants to the private sector to encourage long-term investment in high-risk, innovative technology R&D. As of September 2003, the program had awarded 709 grants worth approximately $2.1 billion. About half of the projects research areas funded have been in the electronics, computer hardware, communications or IT fields. The FY2005 budget proposes to eliminate the ATP, which currently has a budget of $170 million, and to shift the funds to other NIST programs or to DHS.

The Small Business Innovation Research Program (SBIR) was created in 1982 with two broad goals: to more effectively meet federal R&D needs through utilization of small innovative firms (which are consistently shown to be the most prolific sources of new technologies); and to attract private capital to commercialize the results of federal research. The program enjoys bipartisan support in Congress and strong support from small businesses and state and local economic development officials. Overall, funding for the program, provided through a mandatory 2.5% set-aside in R&D agencies, has been adversely affected by the proposed FY2005 R&D budget. Exceptions include areas such as homeland security and bioterrorism, where funding increases are proposed. In a forthcoming assessment by the National Academies of Sciences (NAS), the SBIR program generally has been effective in meeting R&D needs but may require modification to achieve greater success in its commercialization goals.

SBIR funding is awarded two phases. Phase I awards (up to $100,000 for six months) are for exploring technical feasibility. Phase II awards (up to $750,000 for up to two years) funds R&D to expand Phase I feasibility results. Only successfully completed Phase I awardees can compete for Phase II. Subs Awardees are expected to commercialize their results (Phase III) with private capital or through federal procurement. Time lags between completed Phase I and the award of Phase II can extend from six to 18 months. Small businesses and providers of private capital have cited concerns that these long lags in program award cycles, plus the modest financial awards relative to the actual needs of today's small business innovators (especially in biotechnology and advanced electronics) hinder rather than help small companies facing capital shortages and global competition. ■

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about EIA

Headquartered in Arlington, Va., the Electronic Industries Alliance (EIA) is a partnership of electronic and high-tech associations whose mission is promoting the market development and competitiveness of the U.S. high-tech industry through domestic and international policy efforts. EIA includes the full spectrum of U.S. manufacturers. The Alliance's 2,500 member companies provide high-skilled jobs for American workers and products and services ranging from microscopic electronic components to state-of-the-art defense, space and industry high-tech systems, as well as the full range of consumer electronic products. EIA and its five sector member partners — the Consumer Electronics Association; the Electronic Components, Assemblies and Materials Association; the Government Electronics and Information Technology Association; the Solid State and Semiconductor Association or JEDEC; and the Telecommunications Industry Association — work to enhance the industry's ability to bring technological innovation from research to application to the marketplace and beyond, for businesses, government agencies and consumers. EIA and its sector member partners are also working to bolster the future of high-tech through EIA's education foundation, the National Science and Technology Education Partnership. ■

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www.ce.org

Telecommunications Industry Association (TIA)
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www.ecaus.org

Government Electronics and Information Technology Association (GEIA)
www.geia.org

JEDEC, The Solid State Technology Association
www.jedec.org

National Science and Technology Education Partnership (NSTEP)
www.nationalstep.org

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